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VOL. XXII, No. 8

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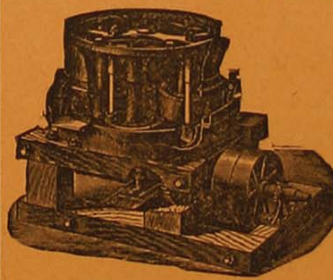
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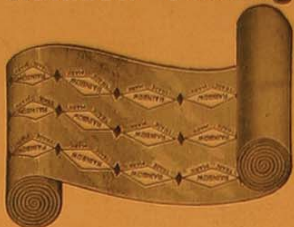


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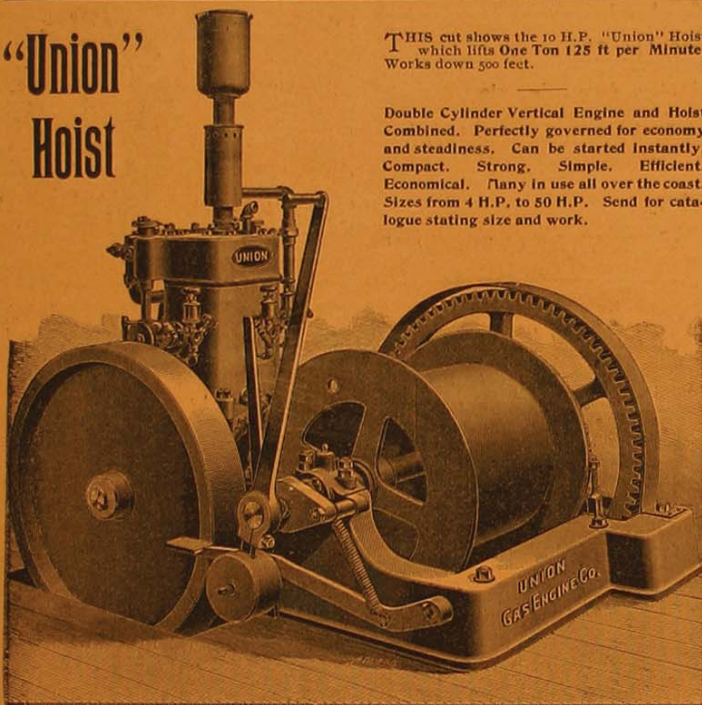
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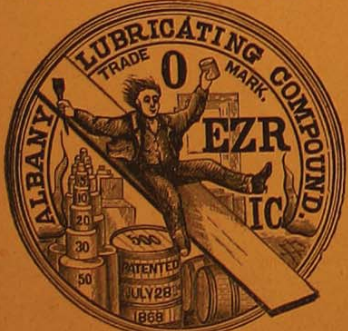
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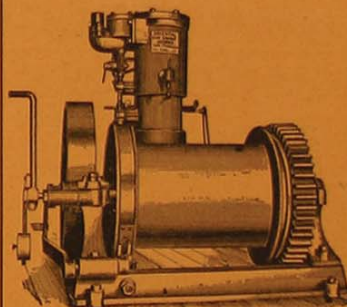
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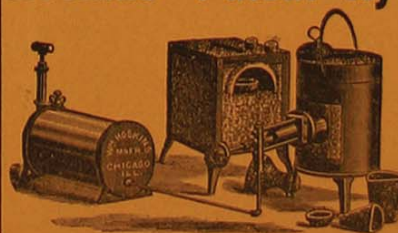
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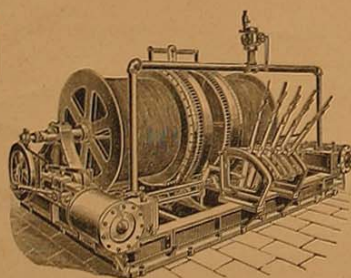
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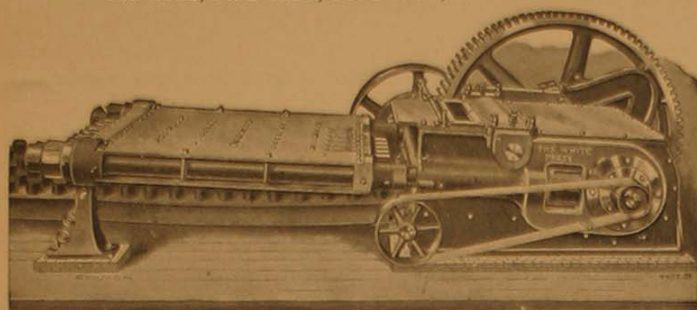
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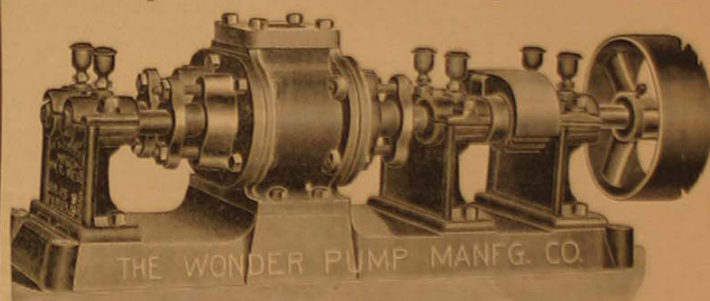
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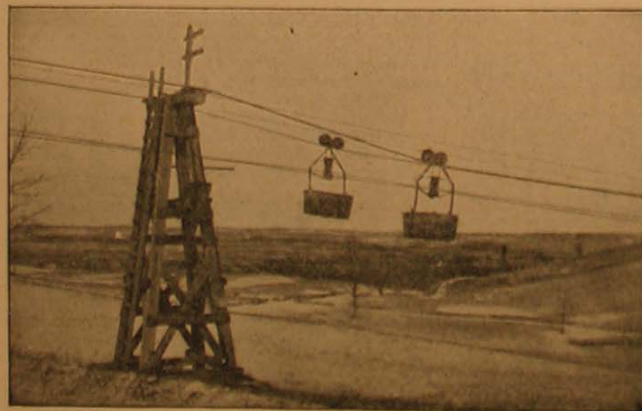
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der. The aggregate railway mileage of the country has now reached the enormous total of 191,000, by far the greatest of any country in the world. Of the several States, Illinois comes first in number of miles, with Pennsylvania and Texas second and third respectively.

PRODUCTION OF GOLD AND SILVER,

The Director of the United States Mint reports the total gold production in the United States in the calendar year 1899 of \$70,694,170, an increase over last year of \$6,249,670. The production of silver is estimated at \$74,424,606, an increase of \$4,040,211.

THAWING DYNAMITE.

The Oregon Agricultural College and Experimental Station announce the discovery of a process for thawing dynamite with perfect safety. By burying dynamite in fermenting horse manure, for one or two hours, before using the element of danger in thawing out that explosive is removed.

Miners need not place material over the boiler in the mill, or under the stove in their cabin to prepare frozen dynamite for use in future.

MONETARY BILLS IN CONGRESS.

The House of Representatives has passed the Caucus bill of the majority party without amendment. The bill of the Senate Finance Committee differs in some not very material particulars from that which has passed the House.

So far as appears the administration members of neither the Senate nor the House have come up to the full measure of the recommendations of Senator Gage. Whether they believe with him or not they have not dared to go to the full extent of his recommendations. What they may be induced to do future developments will disclose.

The House bill first declares for the gold standard, and makes all the public bonds payable in gold, both interest and principal. The law under which they were issued requires that they shall be payable in coin, and the agreement in the bonds is to pay in coin.

In the second place, the bill requires that the United States notes (greenbacks) and the treasury notes, issued under the Sherman act of 1890, shall be redeemed in gold, and when taken in they shall not be reissued except in exchange for gold. This means a practical retirement of those two classes of government paper from circulation, for besides those received for duties and taxes and from miscellaneous sources, the banks will be interested to sort and present them for redemption. It will be rare that gold will be taken to the treasury to exchange for those notes.

Thirdly, the bill authorizes the Controller of the Currency to issue to the banks circulation to the par of their deposited bonds instead of ninety percent as under the present law, and the establishment of banks in towns of 2,000 population with a capital of \$25,000. These two features are preparatory to turning over to the banks the furnishing of all the paper currency.

Fourthly, the bill forbids the issuance after its passage any United States or treasury notes of less denomination than ten dollars, and the issuance of any silver certificates above the denomination of ten dollars.

Fifthly, it does not repeal the law which re-

quires the coinage from the bullion in bank 1,500,000 silver dollars per month, but it provides that as fast as coined and certificates are issued thereon the treasury notes *pro tanto* shall be canceled, it being the intention that there shall be no increase of the money volume from the coinage of silver dollars. Indeed, no provision is made for such increase except through the coinage of gold and fractional silver pieces, and through the action of the banks. It cannot be calculated that our gold mines will produce for coinage more than \$40,000,000 per annum. The increase of money demanded by the growth of our commerce is put at \$100,000,000. How liberal the banks will be in taking out circulation can only be conjectured. As their notes have to be redeemed in gold or its equivalent, it is certain that they will take good care not to run beyond their gold resources, and as the gold stock of the country fluctuates, their note issues will fluctuate, but not to meet the ever changing demand for money.

The House bill having gone to the Senate, that body has the whole money question before it, and its debates will be watched with the deepest interest by the country. Doubtless the Senate bill, whatever it may be, will be contested with desperate energy. It will be discussed as in fact a campaign issue.

Recent events may have a deterring influence on the Senators of the majority party. Secretary Gage has been forced to reluctantly admit that there is not sufficient money in the country to supply the wants of business. That fact has been apparent to many observant and intelligent men for several years. While the commerce of the country has been growing the government has been urging and producing contraction.

The recent flurry in New York and Boston, which required the issuance of clearing house certificates which is not warranted by law, have had a disquieting effect. In addition, gold has commenced to go out of the country in considerable sums, which has a discoloring effect upon Mr. Gage's florid calculations. The tremendous expense of the South African war has had a depressing effect upon British finances, and as the mines at Johannesburg are yielding nothing now to the British gold stock, the Bank of England finds it necessary to send to this country for supplies.

Balances of trade in our favor have naturally fallen off through the decrease of the demand for breadstuffs and provisions in foreign countries. The future, so far as gold is concerned, is not as bright as it has been, and it will become the Senate to consider the money question with the utmost care.

THE METALLURGY OF GOLD.*

BY L. J. STABLES.

THE OCCURRENCE OF GOLD.

We may sum up the teachings of Geology in reference to the origin and distribution of gold in the following statements.

First: Gold is found in the oldest known rocks, and its original position must have been in great depths in the earth.

Second: In the changes these rocks passed through, the gold has been concentrated into segregated quartz veins by some unknown process.

Third: Gold is found in fissure veins of all geological ages. It was deposited from hot

chemical solutions which leached various deeply buried rocks, gathering from them gold with other metallic minerals.

Fourth: In the course of ages, the strata containing auriferous veins was disintegrated, which produced the sedimentary rocks and the placer deposits.

Gold is to be looked for in granite regions, and in those rocks and gravels which have their origin in such regions.

The prospector should have knowledge of the geology of a region before he should begin the search for gold. The prospector should examine every ironstone "blow out" with care. According to the German saying, "the iron hat covers the golden head," or, as the Cornish man puts it, "iron rides a good horse."

The most important minerals containing gold are:

Sylvanite or graphite tellurium (Ag. An) Te_2 , containing 24 to 26 per cent of gold.

Calaverite, containing 42 per cent of gold, has been found in Calaveras County, California.

Nagyagite, or foliate tellurium, 5 to 9 per cent of gold.

The minerals usually called auriferous are very numerous. The most important of these are iron pyrites and galena. The iron pyrites is the largest source of gold next to the native metal.

A native amalgam of gold is found in California, but not in large quantities.

Gold occurs free and in chemical combination. It is found in veins, in rock formations, and in the alluvial deposits of many river beds. When present in the rock formation in visible grains, it has sharp angles and usually not distinctly crystalline, it penetrates the rock directions, and is completely interwoven and attached to the matrix. The matrix is usually quartz, and is interwoven with slaty or schistose rocks. Gold sometimes occurs in small quantities in granite, gneiss and limestone.

Placer gold occurs in small scales, rounded grains and in larger masses, or nuggets. The difference in appearance between placer gold and vein gold lies in the fact that the former has rounded edges and the latter sharp edges.

CHARACTERISTICS OF GOLD.

Gold slowly melts at 2016 degrees Fahrenheit. When heated above this, it volatilizes. When passing from a liquid to a solid state, it contracts more than any other metal. Pure gold is the most malleable of the metals. It may be beaten into leaves that are 300,000 part of an inch in thickness. This same number of leaves of printing paper would make a pile 75 feet high. It is very ductile. A single grain has been drawn into a wire five hundred feet in length.

Gold alloys readily with most metals. The only alloys that find extensive use in the arts are those of copper and silver. Pure gold is very soft. Gold will weld cold. Thus foil and other forms can be used by the dentist as a filling material. The small particles are welded together into a homogeneous mass as the filling is inserted. In coin, it is alloyed with ten per cent of copper to give it hardness.

Silver and gold form useful alloys, the alloy is harder than either of the metals separately. Alloys of gold with lead are very brittle. Some of these alloys are as brittle as glass. A trace of lead will make gold brittle.

Metallic gold is not soluble in any single acid known to chemistry. Mixtures of HCl

*A paper read before the Southern California Academy of Sciences, November 14, 1899, at Los Angeles, California.

and HNO_3 will dissolve it, producing a chloride of gold. A number of reagents will precipitate it. Those usually used are sulphate of iron and oxalic acid.

THE SOURCES OF GOLD.

The supply of gold in the early ages came from nuggets. No expensive mining operations were necessary to secure it. The prospector simply picked it up. The largest nugget of gold ever found was at Ballarat, Australia. It weighed over 191 pounds and was 20 inches long and 9 inches wide. The value of this would be over \$50,000. Other nuggets found in Australia have weighed 135 pounds, 112, 106, 88.

In California, in Calaveras County, in 1854, a nugget weighing 160 pounds was found. In Sierra County, in 1869, one weighing 106 pounds. In Sierra County, 1871, one weighing 64 pounds. Many smaller nuggets have been found in North Carolina.

In looking for gold, the prospector should have an eye for color. Native gold has a peculiar color which is readily recognized. There are minerals that have the appearance of gold, such as iron pyrites and copper pyrites. The iron pyrites is often called "fools' gold." Any person can detect the difference between these minerals and gold by a few simple tests. Gold grains will always flatten when struck with a hammer, whereas other minerals resembling gold are brittle and will fly into many pieces. If the speck of gold is pricked with a pin, the genuine gold is pricked where the other minerals are scratched and show their brittleness. When gold is heated under the blow pipe, and is allowed to cool, it retains the original color. Any other minerals will turn black and not recover their original yellow color. The iron from iron pyrites will be attracted by a magnet, after heating with the blow pipe.

The next source of supply was from placer gold dust. California attracted the attention of the world when the very rich placer mines on Sutter Creek, Amador County, were discovered in 1848. Large pieces of gold were separated by washing in a pan.

METHOD OF OBTAINING GOLD.

These placers were recognized as the dry and the wet. The dry were ancient river beds from which the water was gone. This was separated from the sand by means of air currents, which was caused to blow away the sand and leave the heavier gold. Mechanical methods were next introduced, in which the difference in specific gravity between sand and gold was taken advantage of. One of these appliances was the "pan." It was used when water could be secured. The sand and clay were washed from the gold by giving the pan a circular motion, washing away the lighter particles, leaving the gold and concentrates in the bottom of the pan. Following the introduction of the pan came the cradle and "long tom."

The cradle resembles somewhat the shape of a child's cradle. The maximum capacity was five or six cubic yards a day. It took at least two men to operate it—one to shake the cradle, the other to shovel the dirt onto the screen and pour water upon it. The water washed the finer dirt through the screen where it settled on the bottom. This dirt was then panned and the gold collected. This was a very slow process, and required plenty of water and very rich dirt to make it pay.

The "long tom" was next introduced, and this was a very much improved machine over the cradle. It consisted of a screen,

amalgamated plates with riffles and a long sluice. Getting the amalgam out of the sluice is called a "clean-up." The time between one clean-up and the next is called a "run."

The shallow and very rich placers were worked at first. These were worked in a careless way with a large loss of gold. The "Forty-niners," as they are called, cared very little whether they got out all the gold or not. What was lost was of very little consequence, but what was gained in a day's work was of the greatest importance. He cared nothing for the world's future supply, but looked for immediate results.

Following these processes, involving sluices as described, came hydraulic mining. This process has added more to the wealth of California than all of the other processes of mining and metallurgy together. This is a process that involves large capital. It requires dams for the storage of water and the construction of ditches and pipes for carrying the water to the field of operation. The water when discharged through the iron nozzle has a velocity of 150 feet per second. The water flowing in twenty-four hours will amount to 4,220,000 cubic feet. This is discharged against a large bank, several hundred feet high, and washes the earth into the sluices where the gold is caught. To make the removal more effective, the banks are blasted frequently with charges of from 1,500 to 2,000 kegs of powder.

The gold is caught in mercury in the riffles. The great difficulty is not so much in catching the gold as in getting rid of the tailings. These tailings cover the land and fill the river beds, etc. This filling the rivers and flooding the country with boulders, has called forth special legislation to control hydraulic mining.

The loss of fine gold in these crude processes was large. This loss was overcome in part by adding mercury to catch the fine gold with which it was united to form amalgam. The sand was washed from the amalgam, after which it was heated to remove the mercury, leaving the gold and silver as bullion.

These ancient methods have been very much improved upon in the very best mill practice.

The ore is removed from a ledge by a tunnel passing into it, or by means of a shaft. The ore is brought to the mill, where it is crushed by stamps or rolls, and carried over amalgamated plates by means of water, the gold and silver is caught by the mercury, from which it is recovered by scraping from the plates the amalgam from which the gold and silver is recovered by heat. The ore, after it has passed over the plates, is called tailings. If all the gold the ore contained was free and in the metallic form, there ought to be no loss. If the gold is present in the sulphurets it will not amalgamate, but will be found in the tailings. In many base ores, the most of the gold is present in the sulphurets. If the tailings are examined carefully, particles of pyrites and sulphides of the base metals are found to be present. These heavier particles of pyrites, sulphides of base metals and gold can be removed with a current of water from the quartz, by virtue of their higher specific gravity. Many belt and table concentrating machines are on the market, and their principles are well known. These heavier particles are called concentrates and may be rich in gold. If the concentrates are examined with a microscope, no free gold can be detected, or if they are treated with mercury, very little if any will be extracted. When the concentrates are

treated with mercury, in many cases it will flour, and cause a large loss of mercury. This fact prevents the treatment of many ores profitably. The roasting removes the volatile constituents, such as sulphur, arsenic and antimony, leaving lead, zinc, iron and other metals in the form of oxides. The mercury will unite with some of these metals, and cause large loss by means of chemical union. Concentrates have been worked successfully by smelting. In the process of smelting, the gold and silver are collected in lead, and the lead is removed by crystallization and the last traces by cupellation.

In recent years, many concentrates and tailings have been worked by chemical processes. The processes calling our attention are:

- (1) Cyanide.
- (2) Chlorination.
- (3) Electro-chemical.

(To be Continued.)

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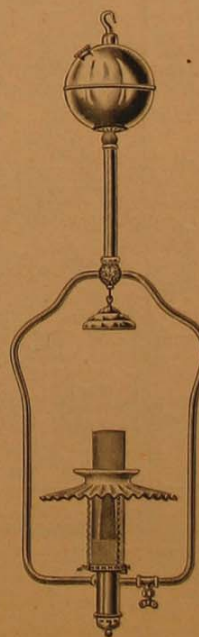
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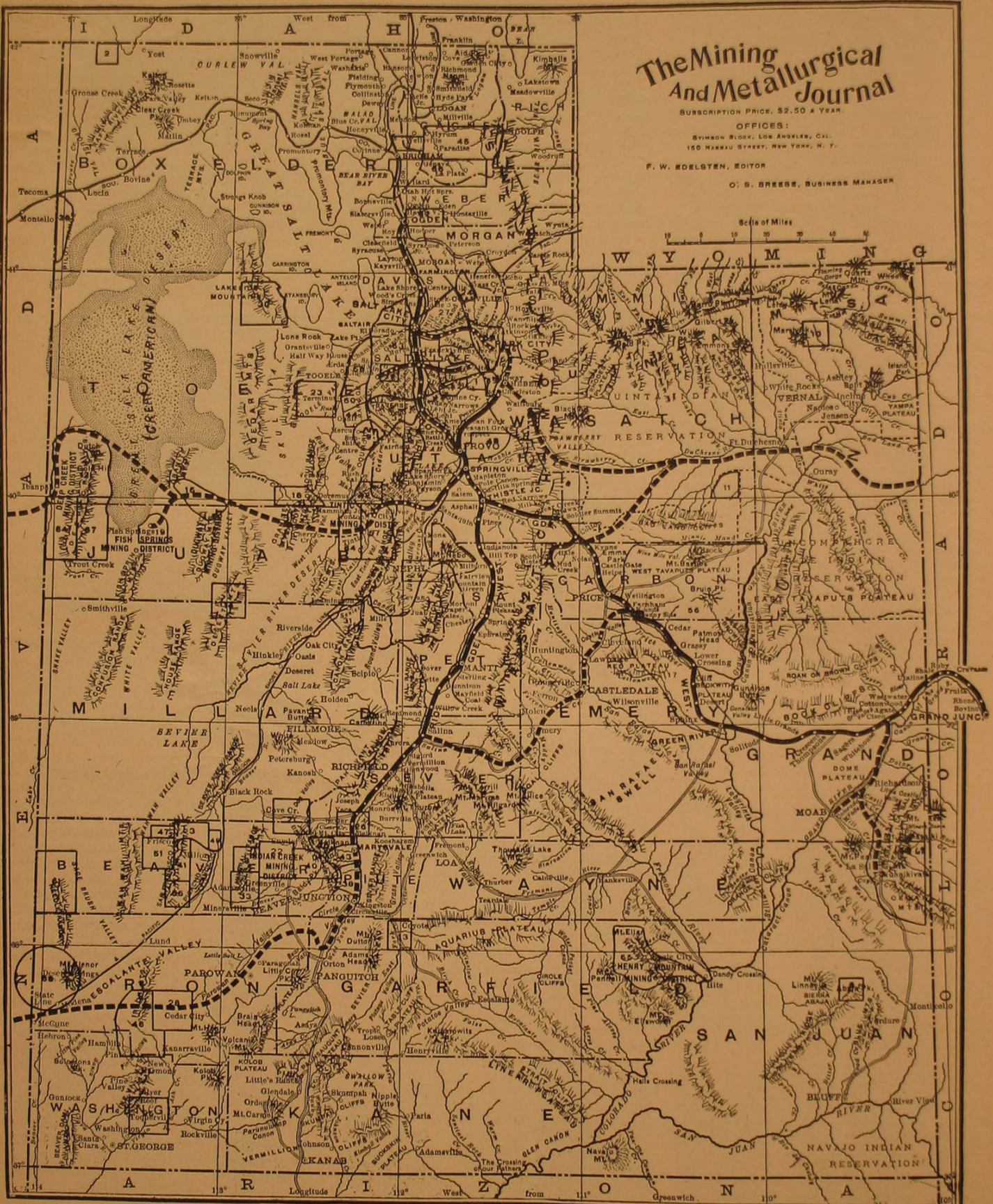
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MINING DISTRICTS.

1. American Fork	N C	7. Box Elder	N	17. Emery	R	29. Juab	C	41. North Star	S W	52. Silver Lake	C	61. W. Higdon	S W
2. Ashbrook	N W	8. Bradshaw	N C	18. Erickson	W	30. Lake Side	N W	42. North Tintic	S W	53. Snake Creek	N C	62. West Mountain	N C
3. Beaver Lake	S W	9. Camp Floyd	N C	19. Fish Springs	W	31. Leamington	W C	43. Ohio	N C	54. Spring Creek	W	63. West Tintic	C S
4. Big Cottonwood	N C	10. Carbonate	N E	20. Gold Mountain	S W	32. Lehi	N C	44. Ophir	N C	55. Star	S W	64. White Canyon	S
5. Blue Ledge	N C	11. Castle Peak	E	21. Gordon	S W	33. Lincoln	S W	45. Paradise	S W	56. Tidwell Rideout	E	65. White Canyon	S
6. Blue Mountain	S R	12. Clifton	N C	22. Granite	N C	34. Little Cottonwood	N C	46. Pinto Iron	S W	57. Tintic	C	66. Wilford	N
		13. Coyote	S C	23. Grantville	N C	35. Lower Placer	N C	47. Preuss	N W	58. Tooele	N C	67. Willow Springs	W
		14. Detroit	W	24. Hard Scrabble	N C	36. Lucin	S W	48. Provo	N C	59. Uintah	N C	68. State Line	S W
		15. Dugway	N C	25. Harrisburg	S W	37. Mountain Lake	N C	49. Rocky	S W	60. Utah	C	69. La Sal	S R
		16. Elkhorn	N C	26. Henry	S W	38. Mt. Baldy	N C	50. Rush Valley	N C				
				27. Hot Springs	N C	39. Mt. Nebo	S W	51. San Francisco	S W				
				28. Iron Springs	S W	40. Newton	S W						

THE MINING DISTRICTS OF UTAH.

(Continued from our issue of Jan. 1, 1900.)

MARYSVALE.

About twenty-five years ago the Ohio district, or what is known now as Marysvale, was first discovered. It consists of a wonderfully mineralized region containing mines of gold, silver, lead, copper and quicksilver. The district lies about 160 miles east of south of Salt Lake City and contains about 100 square miles. During the days of silver mining in Utah Marysvale was a lively spot, as a number of its mines, such as the Bully Boy, Webster and other properties, delivered monthly an exceedingly good tonnage of high-grade ore, but when the decline in silver set in Marysvale became one of the stricken camps, as it lay far away, at that time, from railway communication. There were, however, a number of men in the district who believed it should also be productive of gold ores, and investigation soon proved that they were correct in their conjecture. Of the gold mines existing at Marysvale there is none developed to so considerable extent as the Deertrail and Green Eyed Monster, which lie about four miles southwest of Marysvale in Bullion Canyon, of very easy approach from the valley.

Adjoining the Deertrail on the west and owned by the same people, is the Lucky Boy. This is a mine of quicksilver, the ore being what is known as selenide of mercury and some years ago was extensively worked for the quicksilver, which ran as high as 60 per cent.

Northwesterly from Deertrail, about two miles, and at the head of Cottonwood Canyon there are a number of extensive groups of mines on many of which a large volume of work has been done, and from which a large quantity of ore has been shipped. They are the Webster, Dalton, Bully Boy, Clyde, Crystal and the old Chattanooga properties. The Standard, Star and Cascade mines are also in this vicinity.

GOLD MOUNTAIN DISTRICT.

The Gold Mountain mining district, situated in the extreme north end of Piute County, has passed its tenth milestone and is now in a condition to make an enviable record. For years the growth and development of this soon to be famous camp was necessarily slow. Despite this the district has steadily pushed on. For the first few years of the camp's history the only property to attract attention was the Sevier mine, followed later by the Mammoth, Holland, General Connor, Senator Stewart, Annie Laurie, Blue Bird and the Deseret's Silver King. In addition to these are the following undeveloped properties: Surprise, Congress, Miller, Advocate, Trapper's Pride, Eagle, Ross, Senator Cannon, Fort Dodge, Bunker Hill, Rolling Hill, Gold Queen, Gold Pan and Rio Grande groups.

The Annie Laurie and Senator Stewart have been developed during the past season through a 680-foot tunnel driven in the Senator Stewart, the last 480 feet being on the vein, the exact size of which is unknown, as a twenty-seven-foot crosscut failed to reach the footwall.

The Golden Star Company bears the distinction of being the first dividend payer in the district, and its richest claim is the Blue Bird.

DEEP CREEK.

Over southwest, one hundred and forty miles from Salt Lake City, lies a very wonderful mining country. It is commonly

known as Deep Creek, and contains about 10,000 square miles. Its mountains rise up from one of the most desert parts of the great western mineral reserve and contain in themselves a mining country, the wealth of which it will take ages to exhaust.

In 1872 Utah miners visited the rich discoveries at Deep Creek. It was then well known that there were great mines of gold, silver and copper.

Several hundred locations were made, on many of which much work was done and large bodies of ore exposed.

Lead ore is also found carrying light values in gold and silver, and for a time it was believed that the mines of that part of Utah could be worked at a profit. A smelting plant was erected at Clifton, then the chief center of Utah County.

After repeated efforts those who visited Deep Creek in the early seventies proved to their sorrow that the country was not one in which they could possibly make a dollar by mining at that time.

Let it be here understood that the country known as Deep Creek covers an area much of which lies in the State of Nevada, and it includes eleven independent mining districts.

Since the year 1892 investigation has shown that Deep Creek contains some of the largest gold veins of the intermountain country, as also very extensive mines of copper.

It is to the gold and copper of Deep Creek that the eyes of mining men and capitalists are being turned. There are more than fifty copper properties that show exceedingly well for the amount of work done upon them, whilst of the other properties partly developed there are over 100 good gold mines and prospects.

LA SAL MOUNTAIN DISTRICT.

Few mining camps, isolated and surrounded with so many natural obstacles, have made greater advances in so short a period than the La Sal Mountains, and the past season it came steadily and rapidly forward to the producing point.

The year 1897 saw practically the commencement of the search for mineral wealth in the La Sals. That season closed with a good showing for the comparatively little development work that was done. While there was scarcely a hole sunk in solid formation deeper than ten feet, it was enough to indicate what might be expected by real development work.

Miners' Basin, Beaver Basin, Deep Creek Miners' Creek and Gold Basin all became well-known bases of operation.

Mineral Mountain, at the head of Miners' Basin in the backbone of the range, dividing it from Bear Basin on the east, was the place where the first mineral discoveries were made. Among the principal claims on the west slope of this mountain are the M. I. F., Double Standard, Skylark, Golden Scepter and Sunrise; on the east slope are the High Ore, Blue Bird, Bryan, Green Mountain, Little Dot, Free Coinage and Clear Crystal. On the west slope the Dillon tunnel is being projected, starting at the base of the mountain at the edge of the town of Basin City.

BLUE MOUNTAINS.

The mining region known as the Blue Mountains District lies in Grand and San Juan counties. The formation of that beautiful country is granite, quartzite and slate, with a limited quantity of carboniferous limestone. The metallic wealth of the Blue Mountains is almost entirely in gold veins. As far back as the year 1892 the Danish Girl

Mine developed into a property of considerable importance as a gold mine, and since then about fifty other mines have been located and a limited amount of work done upon each of them.

The work recently pushed on the Gold Standard, Gold Dollar and Manila claims has in each exposed excellent ore bodies, and not only at the above-named properties of the Blue Mountain District, but also what is known as Big Indian, which lies between La Sal and the Blue Mountains.

HENRY MOUNTAINS.

Since the year 1870 prospectors and mining men have looked upon the Henry Mountains as so many veritable treasure houses of the precious metals. This is a very high, isolated group of mountains near the banks of the Colorado River near the junction of the Green and Grand, rising to over 10,000 feet altitude. The Henry Mountains are as yet largely unprospected, but there are several gold properties located there, chief of which is the celebrated Bromide Mine.

Much of the ores of the Henry Mountains properties may be treated by the cyanide process, and the copper so far discovered there is an excellent ore for concentration.

VERNAL.

The last district in Utah to spring into prominence is what is familiarly termed Vernal, or the Uintah country. It has not yet developed into sufficient prominence to identify itself as a mining district, yet a strong vein of copper has been uncovered which, according to recent reports, outcrops for a distance of forty miles.

GEOLOGY OF THE COCHITI.*

BY WM. JENKS.

The following is a resume of observations and conclusions arrived at since the last discovery of Cochiti Mineral District. Time and opportunity may change my idea, as neither myself nor any other person is infallible. We are all liable to err. If I have, it has been done unknowingly.

My knowledge of the country to the south of Albuquerque is not very extensive, so I will pass that by and try to describe what I have seen, and my conclusions as to the country due north from Albuquerque to the Chama River, a distance of nearly 100 miles, as it may interest some plain reader seeking knowledge, like myself, and draw out other opinions and observations.

The central core or axis of the Sandia Mountains is generally granite, a metamorphic or changed rock, of archaic or "beginning" age, foundation rock, probably the ruins of an older world, perhaps many worlds, worked over and over, and changed through the influence of heat, in the shape of hot water and steam, superheated or otherwise, and possibly charged chemically.

This foundation rock is solid as the earth itself, immovable, the rock of ages, and has long retained its place.

It seems to me that the eastern line of the mesa, east of the Rio Grande, between Albuquerque and Bernalillo, was undoubtedly the axis of an incline, i. e., the beds or layers commonly called the strata, dipped in opposite directions, to the east and west, from the two sides of the line of the summit of the underlying granite.

Imagine a gradual building up of sedimentary material, lime, sand, etc., surrounding

and to some extent covering the granite. As ages roll on, the continually increasing weight exerts vertical pressure and consolidation, necessitating considerable motion, and in a lesser degree horizontal contraction. The motion often torsional, results in friction, the friction results in heat, and as a product we have fluid lava forced upward and outward by the superincumbent weight in the line and plane of least resistance, a mountain high and dry on its solid foundation and a rough valley between, as a conduit for a great river.

There was much denudation or washing away of the broken up surface, redeposition of sandstones, gravels and shales, and later denudation of these; evidences of which we can sometimes feel in passing over arroyos and arroyitos.

An old authority says, "The mountains have been formed by the hollowing out of the valleys and the valleys have been hollowed out by the attrition of hard materials coming from the mountains.

"The great system upon the surface of of this earth is that of valleys, and however this system shall be interrupted and occasionally destroyed, it would necessarily be again formed in time, while the earth continued above the level of the sea."

The eastern slope of the Sandia Mountains fell in more pleasant places, movement was not so violent. To understand the geology, it should always be borne in mind that successive uplifts, downthrows and constant erosion have changed the face of the earth continually, by removing the upper surface of masses of rock, exposing those once buried and again burying others to in time again expose them.

Albuquerque volcanoes have a general northerly and southerly course. Their direction may have been influenced by some seismic (earthquake) disturbance, opening a fault fissure, that can be traced in a nearly direct line to the Cochiti District, and on, crossing the Chama River near Abiquiu, Rio Arriba County, with a course bearing to the east. Coming south, it is still possible that Hell Canyon, Tijeras Canyon, etc., may be in the axis of anticline, the western side of which may pass into this fault fissure.

This dislocation may be an extension to the north and south of an older fault fissure, originating in the Cochiti Range, to be hereafter described as the mother vein of that district; on the brink or the vein of an old river bed, that in the Cochiti widened out and formed a lake; or possibly the original walls, or country rock, were of some soft material, easily decomposed by the hot ascending waters, that were plentiful in early ages.

It must be admitted that south of the Cochiti Range this line of fault fissure is for some distance imaginary, capped as it is by sedimentary strata, and volcanic lava, but we find in some places considerable evidence on the surface of decomposed light-colored rock. This usually forms the walls of the fissure, and from its irregular joints, and its often showing when weathered rings in series, it may have been diorite.

We will now pass on to the Cochiti District. The country is now partially and has been wholly covered with tuff or pumiceous tuff, sand and conglomerate. Tuff is an accumulation of ash and other substances, ejected from volcanoes, and more or less firmly compacted together. In this case, it is a light and spongy rock having numerous vesicles or small cavities, that originally inclosed steam or gases. Obsidian or volcanic glass is of the same composition, but solidi-

fied quickly. Pitchstone, rhyolite, etc., have the same acid character and are archæan rocks as granite, excepting that they have been remelted.

The tuff or tufa was erupted as mud in various stages of humidity accompanied with intense heat.

Acid rocks are usually light in color, and composed principally of silica or sand similar to quartz.

We will consider this as the first eruption of the district in both chronological and geological order and extensive character, that is, it covered the surface of the earth in that locality.

The ordinary mind has no conception of the vast amount of this kind of material now covering the older rocks of the greater portion of the Cochiti and Jemez Range of mountains.

From some cause or other we have had an extrusive eruption, that covered the surface and redistributed the equilibrium. There was also undoubtedly considerable rocking motion, alternately from that and other forces, leading to another eruption intrusive in character, that is, one that from external pressure, insufficient strength, viscosity, or some reason or other, was prevented from coming to the surface, but at the same time broke up the superficial volcanic tufa, and left it in a very fit state to be easily washed away, thus exposing the mineral veins, that are a common and usual accompaniment of the basic intrusive rocks, the diorites and the porphyries.

They do not flow over the surface, are a never failing sign of great denudation, have come from unknown depths, have no particular period of eruption, and their source may be far away.

Basic rocks are poor in silica and sand, seldom glassy, and generally of a dark color. Acid rocks are more general, basic rocks more local in their distribution. Basic rocks carry a good percentage of the bases, iron, manganese, lime, etc., and are a chemical compound more easily fusible than the lighter colored acid or silicious rocks. In the absence of basic rocks it is very questionable whether we should ever have had any Cochiti or any other mining district.

(To be Continued.)

NOTES ON YMIR MINE AND ITS MILL PRACTICES*

BY S. S. FOWLER, S. B., NELSON.

Lying north of the International Boundary, west of Kootenay Lake, east of Columbia River and south of Nelson, and the outlet of Kootenay Lake is a roughly quadrangular mountainous country, covering about 1,450 square miles.

Occupying the central portion of this quadrangle is the drainage area of the Salmon River, a considerable stream, which has its source within a few miles of Nelson, and flowing south joins the Pend D'Oreille near the Boundary.

This Salmon River country, covering about 900 square miles was practically inaccessible until the construction of the Nelson & Fort Sheppard Railway in 1893, and it was not until the summer of 1896 that any considerable mining activity was manifest. The country, therefore is possessed of a very brief history. Aside from the placer mining operations of 35 years ago, which were carried on

near the mouth of Salmon and along the Pend D'Oreille, there is now no evidence of mineral location until about 1885, when, two years before the discovery of Silver King near Nelson, by the Hall brothers, locations of quartz claims were made by these same men near the head of Wild Horse Creek a small stream entering the Salmon from the northeast at the present town of Ymir, 18 miles from Nelson.

Nothing more appears to have been done for the next decade along the Salmon Valley, but, as stated above, in 1896 many claims were staked, and since then the district has made substantial progress. Today, aside from the property named in the title, the Fern on Hall Creek, the Porto Rico, on Barret Creek, the Yellowstone, on Sheep Creek, the Second Relief and Arlington, on the North Fork of the Salmon, are considerable producers, or nearly in condition to produce, and there are many other properties throughout the district affording excellent prospects, and indeed some of them have made small shipments of smelting ore.

Physically, the Salmon country is not complicated in structure. It is mountainous, but few of the mountains reach an altitude of more than 7,500 to 8,000 feet, and the summits are generally rounded. The creek valleys are deep, however, and glaciation appears to have been an important factor in determining the present topography. The glaciers, however, have I believe all disappeared, although in the Slocan country to the north there are many remnants of that powerful moulding agent to be seen.

The rocks which underlie the region being described are predominantly of igneous origin. In a very general way it may be said that east of Salmon the granites are in evidence, while to the west augite porphyrites, schists derived from them, some small gabbro bosses and large areas of tuffs and agglomerate occupy the field. But throughout these rocks may be seen considerable inclusions of sedimentary rocks, principally slates, except along and near the range which forms the watershed between the Salmon and Kootenay Lake, where there are thick beds of quartzites and some crystalline limestone, extending more or less continuously southwesterly into American territory. The country is a very interesting field for geological research, and deserves more extended study than can be given it for a long time. The Dominion Geological Survey sent a party into this field under R. G. McConnell, during the summer of 1897, but little more than a general reconnaissance was accomplished, the shortness of the season and smoke from forest fires usually causing an early return of the field parties.

As to the respective ages of the rocks hereabouts, the slates have not been traced to connection with the Kaslo series east of the Slocan slates, but from their lithological features, one is inclined to ally them with that series, and if that is proper, then the small slate areas of Salmon River are probably of Cambrian or pre-Cambrian age. The various basic igneous rocks may be of different ages, but Mr. McConnell places the augite porphyrites in the carboniferous. Some of the granites appear to be comparatively recent, but the youngest rocks in the vicinity occur in dikes of blackish to dark grey color, varying much in texture and composition, and piercing the rocks above named, and I believe, most of the veins of the district. Generally, these dikes may be described as mica diabase, the biotite probably being a

* (Paper read before the September meeting of the Canadian Mining Institute.)

first product of alteration, while frequently the whole mass has become completely kaolinized.

Coming to the Ymir Mine itself, we find it on the west side of the valley of a north fork of Wild Horse Creek. This valley lies in a slate area several miles in length, and about 4,000 or 5,000 feet wide. The slates are limited on the east by granite and on the west by porphyry. They strike about N. 35 E. and stand on edge, the line of contact with the porphyrites being approximately parallel to the strike. Extending from a point near the contact, in a direction about N. 65 E. is a fracture in the slates which is traceable several thousand feet, but within the distance along which this one fracture can be identified there are no more ore bodies known other than that which has become the Ymir Mine.

This property was taken over by its present owners in November of 1896, since which time 5,000 feet of development has been done, resulting in showing an ore body about 500 feet in length, with its end limits practically parallel and vertical. A depth of nearly 500 feet has been attained, but very little water has been encountered, in fact barely sufficient to justify running a pump for sinking.

In plan this ore body shows a decidedly lenticular shape, with a maximum width of ore of about 30 feet. No disturbance of importance have shown themselves, but there are many slips and several partially open narrow fissures, while two principal dikes with a number of branches cross the deposit, generally nearly at right angles to the latter. From a structural standpoint these dikes form one of the most interesting features of the mine, and will be alluded to again. Beside the numerous horses of slate, which in so wide a fissure must be frequent, the vein filling is quartz, impregnated with pyrite, galena and blende, no copper mineral having ever been found.

The ore appears to have been deposited at two different periods or else derived from different sources, for the eastern 300 feet shows a perfectly white quartz, and the sulphides contained are coarser in structure and brighter in color than in the western 200 feet of the ore chute, where the quartz is not only frequently of dark smoky blue color and often nearly opaque, but the gold tenure is considerably higher. Near the region where these two varieties of quartz join they are curiously intermixed, but may be easily distinguished. Throughout the mine the walls are generally very free, but in places along the hanging of the blue quartz there is not only no clay parting, but the quartz seems to have replaced the slate, retaining the structural features of the latter, and becoming difficult to distinguish underground from the country rock.

(To be Continued.)

PIERCE COUNTY MINES.

(Continued from our issue of Jan. 1st, 1900.)

LEOLA MINING COMPANY.

"We next visited the Leola Mining Company's properties, owned by Chester Thorne, Charles Richardson, T. H. Wilkins and others, all Tacoma people, stopping first at their camp, which is located about 600 feet down the mountain toward Canada Creek from the Surprise Mine, and consists of an office, cook house, bunk house and superintendent's house, which is occupied by Superintendent Ferguson and wife. The buildings are neat and comfortable. The Clipper Mine is located about fifty feet lower down the mountain and

adjoining the entry is located the blacksmith shop. This entry was started on less than six inches of ore and is now in 230 feet; the vein is five feet wide, having six inches of solid chalcoppyrite ore, the samples we took assaying:

"Gold, .02 of an ounce; silver, 6.40 ounces; copper, 15.50 percent.

"Total value, \$16.59 per ton.

"We next visited the Climax Mine, which is opened about 1,200 feet south of the Clipper, on the same mountain side and belonging to the same parties. Here is a rock slide some thirty feet wide which has been blasted away and entry driven about forty feet on the vein, but as no solid ore had been struck we did not take any samples.

WORKING OTHER CLAIMS.

"Mr. Wilkins, the Superintendent, has also started a shaft on the Alloa claim which is reported very promising, but we did not visit them. Mr. Wilkins is running a crew of fourteen men, double shifting the Clipper and Climax and running a shift on the Alloa.

"The Blue Star group of mines is located about seven miles from Fairfax on the Washington Co-operative Mining Syndicate's trail and has several fine looking veins, a sample from which assayed:

"Gold, .04 of an ounce; silver, 6 ounces; copper, 9.50 percent.

"Total value, \$39.55 per ton. They belong to A. W. Grayson and Irish Brothers, who have run some forty feet of tunnel and are continuing development work.

"The Margaret, belonging to Angus Ferguson, is located 1,500 feet southeast of the Surprise, and has good surface showings, a sample from which assays:

"Gold, .14 oz.; silver, 7.40 oz.; copper, 10.20 percent.

"Total value, \$48.98 per ton.

"The Cleo Mine, located on the south side of the Carbon River, opposite the mouth of Canada Creek, belonging to E. E. Brehm, of Wilkeson, and William Evans, has the reputation among the miners of having good veins. Buildings are now being erected, and after January 1, 1900, development work is to be pushed.

"The Summit Mine, lying about 4,500 feet east of the Surprise, has recently shown some good ore. This is the property W. H. Remington of this city is interested in.

DEPOSIT OF PULP.

"The Hepzibah, owned by the Sexton Brothers and others of Tacoma, and located on the south side of the Carbon River, opposite the Blue Star group, is showing up well. They are now driving a crosscut tunnel 150 feet long through granite to crosscut their vein, which they expect to have completed by early spring, having already between fifty and seventy-five feet driven.

"We are reliably informed that about one-half mile from the Carbon glacier, on the south side of Carbon River, Mr. Watson and others, of Orting, are opening up some fine veins, having just completed thirty feet of entry, and having let a contract for an additional thirty feet, and that on the east side of the Carbon glacier and across the Winthrop glacier, called the 'glacier basin,' there are over fifty veins located, and their most accessible route is via the Carbon River Valley. This is where Professor Chamberlain is located. He reports sufficient funds now in bank at Hoquiam to put the properties on a shipping basis, which he intends to do the coming spring.

"The Buckley Mining Company have lo-

cated two groups of claims on Chenuis Creek. There are many other properties located, a partial list of which we submit in Exhibit 'I.'

DISTRICT HEAVILY TIMBERED.

"This district is heavily timbered, which makes it very hard to prospect, but which will be of incalculable value for building and mining purposes. The varieties are fir, spruce, hemlock, red cedar and Alaska cedar.

"Immense water power everywhere abounds, which will furnish power to crush, concentrate and matte the ores.

"Coke will be manufactured at Fairfax, which means cheap reduction of ores. We do not know of a locality in the United States where rich ores, water power, timber and coke are so closely associated with the opportunity for cheap transportation, for the haul from the mines will be entirely down hill to the railroad at Fairfax.

"We regard a wagon road as an absolute necessity to the speedy development of this district, and that construction is feasible at a nominal cost for a mountain road.

"In regard to the commercial advantage the speedy development of this district would be to Tacoma, we believe it would benefit every man, woman and child and that if fostered by Tacoma interests and the trade kept here, it will do for Tacoma what the mines of Montana have done for Butte, Helena and Great Falls. It must be borne in mind that this territory is naturally tributary to Tacoma, but if we do not exert ourselves to care for it, we may find our friends across the bay will be enjoying the traffic.

RECOMMENDATIONS.

"First—That the Chamber of Commerce and Board of Trade pass a resolution commending to its members and the public generally the development of the mines in the Carbon River Mining District and requesting our daily papers and all papers and periodicals published here, to give our mines special investigation and mention, to the end that our city may receive the immediate benefit now being enjoyed by our sister cities.

"Second—That the mining committee of this body be instructed to visit the Pierce County Commissioners and urge the building of a wagon road from Fairfax to the Surprise, Clipper and other mines, to enable the taking in of machinery and hauling out of ore, which is now being piled up awaiting transportation to Tacoma, and to continue their effort until the road is obtained.

"We submit herewith reports of the geology in the district by C. C. Snow, E. Edward Cone and T. A. Wilkins, all practical miners of many years' experience.

LOCATIONS IN THE DISTRICT.

"Locations in Carbon River Mining District are:

"Surprise, Ship Lake, Ship Lake Extension, Alpena, Rainier, Snowdon, Sunnyside, Huron, Okamos, Hog Back, Ferry Hill, Leadville, East Lake, Jim Dandy, Tacoma, Eureka, White Owl, Black Hawk, Gray Eagle, Gray Eagle Extension, North Mine, Plexus, O. K. Crack-a-Jack Extension, Pyrite, Apex, Oxide, Quartz Crystal, Quartz Crystal Extension, Bassick, Colorado, Mountain Ferguson, Cascade, Nora, Jennie, Alloa, Dolphin, Dewey No. 2, Rosette, Conglomerate, Michigan, Golden Star, Golden Star Extension, Crack-a-Jack, 1st Chance, London, Eureka No. 2, Margaret, Ellis, Ellis Extension, Nevada, Emma, Montana, Chicago, Summit, Black Giant, Phoenix, Zion, Bellingham,

Gold Hill, Cedar, Monarch, Diamond, Pine, Irene No. 1, Irene No. 2, Heitman, Maj. Copley, Forest King, Little Fortune, Washington, Myrddyn, Hard Scramble, Palmer, Big Buck, Hepzibah, Alpha, Intrusive Sheet, Morning Star, Falls Creek, Lincoln, Gulley, Glacier, Col. Thompson, Old England, George Archibald, Peacock Blue, Clipper, Climax, Hemlock, Sulphide, Champion, Eagle, Ruby, Rockford, Carbon No. 1, Carbon No. 2, Silicate, Capt. Gulley, Blue Star, Dawning Hope, Silver King, Carbon, White Bear, Honey Pot, Silver Head, Cariboo, Mesmer, Sadie, Cleo, Bonanza King, Age of Reason, Lada Clara, Austin, Beautiful Bill, Spes Bona, Royal Canadian, Blue Star.

(To be Continued.)

CORRESPONDENCE

ARIZONA.

(From Our Special Correspondent.)

CHLORIDE, ARIZ., Jan. 12, 1900.

Considerable surprise was expressed this week at the news that the Elkhart Mine had closed down and all hands discharged. The rumor seemed to have the face of truth until the mine was visited and the truth of the matter ascertained. For some time past the Elkhart has been having considerable new development work done which required the work of about twenty men more than were usually employed. The management, however, on the first of the year, decided to discontinue this branch of the work for the present, at least, and in consequence all those employed on development work were discharged. The mine is producing as much good ore as ever, and everything is moving along in its old channel of prosperity, and with the coming in of the new year, promises greater things than ever.

The new concentrating plant at the Merrimac Mine is almost in readiness to fire up. The engine, boiler and all the machinery is the finest and best ever brought into Arizona, and the plant is destined to work well and to more than double the old methods of work. There is an abundance of ore on the dump awaiting its completion and the ore bodies in the main shaft are fully as great as ever. Members of the company will soon arrive from the East, and a system of new development for ore will be inaugurated.

The Payroll Mine is getting its new gasoline engine and machinery in position quite fast, and the big hoister will soon be in readiness to facilitate development work. At last reports it was said that the mine was to have a new 100-ton concentrator, but Mr. Timmons has not been seen; the rumor is not verified.

The Midnight Mine is tied up and standing stock still. The trouble is non-payment for contract work by Mr. Jones, who is at his home in Chicago. The owners, who are also the contractors for the late development work, keep the mine guarded until the present conditions are changed. The mine has a good body of high-grade gold and silver ore opened up below.

Arizona Activity.

(From Our Special Correspondent.)

PHOENIX, Jan. 7th, 1900.

Hon. G. W. Hull and John Argyle of Yavapai County have recently located and acquired control of eleven locations to the west of the Congress Gold Company mines in central Yavapai County, claimed to be on the Congress ledge. Mr. Hull has been on a

still hunt after this property for nearly four years. The Congress Company has covered the vicinity to the east, but through some evident oversight a valuable section of ground to the west was left unlocated. Mr. Hull will begin operations at once in development, and will soon erect the necessary mill and works for the treatment of ores.

It has been rumored that the mine and smelter of the Copper Queen at Bisbee soon will shut down for several months, for the purpose of overhauling the present plant and installing modern and up-to-date machinery and appliances, as well as to increase the capacity of the works.

The Amalgamated Copper Company—otherwise the Standard Oil trust—has entered Arizona copper fields in an energetic manner. Its confidential agent, W. E. Burrage, a noted expert, upon whose recommendation the famous Santa Rita mine in New Mexico was purchased for \$3,500,000, is now superintending operations on a large group of copper claims within eight miles of the King Solomon mines in Northern Maricopa County. He states that the copper indications are the best that he has ever seen in any district. There is a gossan capping that can be traced for eight or ten miles, and in some places is a half-mile in width. In the Spring a large amount of machinery will be necessary for the prosecution of active work on this property.

J. A. Mathies, also a mining expert in the employ of the Amalgamated people, has been in the vicinity of Jerome and Prescott for the past six weeks, and has taken leases and bonds to the aggregate sum of \$400,000 on claims and prospects in that region. The Standard Oil seems at last to have decided to come into Arizona. Just after the purchase of the Anaconda properties from the Daly corporations by the Standard Oil Syndicate it was reported that the latter pool would purchase or control every large copper mine and smelter in the United States. An offer was made to W. A. Clark for the United Verde at Jerome. Mr. Clark refused to entertain the proposition, replying that the United Verde was not in the market. For a time thereafter the Amalgamated Company seemed loath to enter Northern Arizona, not wishing to antagonize Clark; but it would now seem that conditions have changed, for it is eager to acquire copper properties.

The recent changes in the management of the Copper Queen at Bisbee, the Arizona at Clifton and Morenci, and the Old Dominion at Globe, are said to have been inspired by the Standard Oil people, who have acquired, so it is reported, large blocks of stock in each of the companies, these changes being in line with a policy of aggressiveness and increase in the capacity of the various plants coming under control. The changes will involve the expenditure of vast sums of money in modern mining and smelting machinery and appliances, particularly in the adoption of electricity wherever practicable, such as trolley lines in the mine and on the surface, electric cranes, tramways, silica mills, and electric motive power for shop machinery.

Jerome is the center of great bustling in copper mines. New companies spring up each week, and the entire country for miles around in all directions is plastered with location notices. G. W. Hull already has organized three companies for the development of various claims near Jerome, and has two others in process of formation. The News, being operated by Owens and Van Zandt, of Butte, Montana, is now down about 900 feet.

It has a force of 35 men, and is working 24 hours a day.

The United Verde Extension, near the News, is pounding away looking for the mammoth ledge of the United Verde, while the Black Hills people on the crest of the same hill, claim to have encountered this great ore body in the upper shaft at a depth of 70 feet.

The Copper Chief and Iron King properties on Equator, the former under management of Arthur Hendy and the latter of J. L. Giroux, are being worked as energetically as men and money can do it. This Equator Hill is fabulously rich, and has been tied up in the courts for the past ten years by litigation between rival claimants to the property. The present division is the result of a compromise effected a year ago between W. A. Clark and Hendy, et al., and the property will be opened up in the spring in earnest.

The Cherry Creek District in Yavapai County continues a producer of gold. Each month or six weeks witnesses the shipment of bullion to the value of from \$10,000 to \$20,000. Another fifty-stamp mill will be erected, which will increase the output. Machinery is badly needed in this district, but is very expensive on account of the rough character of the country which necessitates the use of pack trains.

L. D.

CALIFORNIA.

(From Our Special Correspondent.)

MANVEL, Jan. 8, 1900.

Sam Yount's copper mine at Good Springs has shipped another car of rich copper ore to the smelters from Manvel station.

Johnny Yount, Ben Hamilton and Jim Fisk have bonded their copper mine at Good Springs, Nevada, to a gentleman by the name of Clark. The ore now being shipped from Nevada to the smelters looks very rich and of good combination.

Mr. Moore has another carload of copper ore from his Excelsior copper mine at Copper Camp on the platform at Manvel ready for shipment as soon as it can be had.

The daily product of metallic copper bullion by the Valley Wells (Ivanpah Smelting Co.) smelter is about 40 bars of 300 lbs. each, or six tons bullion per day, and the gold values in it are not far from \$5 per each ton of copper—and upwards of this.

On the platform at Manvel are about 57,000 pounds of copper bullion from the Copper World Smelter, and as soon as cars can be had this bullion also will go to market, and there is more coming.

An amount of lead-silver-gold bullion from the Tacopah Smelting Works awaits shipment from Manvel Station. It is stated that F. C. House of this company or the company will put in a larger jacket furnace soon and increase the product. To that result a force of men will be put on to the mines there.

Jim Patton of Vanderbilt has sold Extension East of Gold Bronze Mine, three claims, as publicly stated for \$12,000, and Mr. Fay, the purchaser, started up work on the same immediately, opening up the ledge of vitreous quartz five to six feet wide, at 60 feet depth, averaging over \$50 per ton, showing free gold also. There are streaks of ore showing oxides of tellurium, making this ore very pretty.

Pete Wagoner of Vanderbilt, owner of the Alice Mine, a recent location near the Boomerang Mine, struck a bonanza of ore on Friday last, similar ore to the body found in the

Extension of the Gold Bronze. The inhabitants of Vanderbilt were out viewing Pete's discovery on Sunday.

Mr. Wood of New York is working full crews of men on the Turquoise claims, and an exploration shaft is being sunk down rapidly.

Manvel's mail to the County Recorder of San Bernardino County delivers more new location certificates for record than any other point in the County.

The Barefoot Mine at Sandy, Nevada, 46 miles north of Manvel, has started up the steam arastra, running on the low-grade ores. The rich ore is being sacked for shipment to the smelter. This ore is gold, some free milling and porphyritic, some very rich ore. This one claim is now under bond for \$100,000, and there is also a bond on the Green Monster claim. The parties having it are exploring the property.

A correspondent writing me lately says: "Capt.:—Where in H—— is Manvel, anyway?" To him and all others so at sea let me say Manvel is at the terminus of the California Eastern Railway, near the base of New York Peak, and about 30 miles nearly due northwest of Blake Junction, a station on the Santa Fe route. The gold field is but two miles from Manvel, up the eastern slope of New York Mountain. The elevation of Manvel is 4700 feet, and there is ample water and wood, as well as a good climate for a mining camp.

The strike on the Good Hope claim of last week developed well, and thirty tons of ore are on the dump now in consequence. There are five claims in the Good Hope group. This group is located on New York Peak, just south of the mouth of Keystone Cañon, and is also about two miles northerly from the old New York Mines, also about one mile west of the Old Shoes Mine group of claims that were recently sold. The Good Hope ore is similar to the Old Shoes claim ore.

The Aurora claim of Wolframite or Tungsten ore near the Columbia Mine, Providence Mountains, contains Tungsten in paying quantities. It belongs to Mr. Deitz. The samples shown are crystalline and black.

Manvel has several new houses in the past few days, and now Monaghan, Briggs and Murphy of the Needles are to move from Vanderbilt a 40x60 foot building and also a residence house to Manvel. When in place it will be fitted up for sleeping rooms in connection with Mr. Nichols' hotel. This is a substantial improvement here.

Mrs. Payne has received her appointment as postmistress of Rosalie (Valley Wells) and the mail route will be opened by the United States instead of by private carrier.

It is understood that there will be a daily mail soon between Blake and Manvel, and if there is not a daily train system established, then there will be a daily train of Concord coaches put on this as a stage route. Inasmuch as Manvel is a distributing center of several United States mail routes, it is understood to have been decided that a daily mail service must be given the Manvel office from Blake. This is good news.

More and more of the gold field ground of New York Peak is being daily located. A large lot of samples of the new discovery are soon to leave here for assay at Los Angeles, Calif. Hagan, Lewis & Co. of San Francisco have their examiner and purchaser in this camp now looking out for new discoveries.

A recent discovery on New York Mountain was sampled in 25 lb. lots of selection. This

mill run gave \$22.60 per ton gold. The sample was taken at about 15 feet depth, a quartz with fine pyrites as the ore.

Gus Hamstadt and partner's crew of miners on New York Peak keep up a merry booming of blasts on the very rich copper and silver-lead recently opened up.

Soon it will be possible to obtain by purchase outright a village lot at Manvel, and the miners are jubilant.

An extensive exploration shaft on the Old Shoes Mine will soon be in operation, going down with the vein. A contract was let January 8th for a 100-foot shaft on this mine to Mr. Duval. GILES OTIS PEARCE, M. E.

Miscellaneous Mining News.

ALASKA

The Klondike output for the year is: Gold, \$16,110,129; silver, 1114,617. In the year 1898, the gold yield was \$11,038,478, and silver, \$80,728; an increase of Klondike gold is shown of \$5,071,651, and of silver, \$34,119, the total increase being \$5,517,770. The Klondike annual gold yield thus for the first time eclipses that of California by about \$1,000,000.

ARIZONA.

On the Rough Rider the principal one of the ten claims, owned by Judge J. D. Bethune in Walnut Grove district, near Prescott, they are sinking at the junction of two veins, where the sulphurets are beginning to show in quantity, and he thinks he has the best undeveloped copper mine in the country. They have a small force of men at work at the mine, and expect shortly to erect a smelter upon the property.

John F. Williams is organizing a company to develop two copper claims he has located in the Dragoon mining district, assays from which run 40 per cent copper.

During the last four months of 1899 the mining department of the University of Arizona at Tucson, in addition to the regular work of the institution made 71 qualitative of rare or peculiar minerals gratuitously for the mines and prospectors of the territory; 11 quantitative analyses; 351 fire assays; 6 cyanide tests on gold ores and 1 mill run.

CALIFORNIA.

AMADOR COUNTY.

The Kennedy Mine.

The new station in the north shaft of the Kennedy mine, known as the 2300 foot, is being opened, the sinking having recently been completed to that point. As all levels in the Kennedy mine are named from the vertical depth below the level of the collar of the shaft and as the shaft is an incline, this makes the actual depth of the shaft between 2700 and 2800 feet. The new shaft at the Kennedy, which shaft is vertical is now 900 feet in depth. Ground was broken for this shaft on Thanksgiving day, 1898, and about fifty feet sunk by windlass, when the water became so troublesome that little progress was made until the new power plant was installed in April, 1899, since which time about 850 feet have been sunk. Four power drills are used in the sinking, and, although the rock is very hard, steady work has made a good showing

in the shaft. The equipment of this shaft is a steam furnace and boiler, the steam from which operates the hoist, the compressor and the other necessary and useful machinery around a well equipped mine. As a whole, the year's work at the Kennedy mine, has been very satisfactory.

BUTTE COUNTY.

Last week two of the big gold dredges on the Feather River, a little below Oroville, resumed operations with electric power after a shut-down of about a month to change machinery and also because of lack of fuel. Power is supplied by the Yuba Power Company from the Yuba River, at a distance of twenty-six miles. One or two more will soon use electric power as will two new Postlethwaite or Risdon dredges to be launched this month.

The two new dredges are very large, having a capacity of handling 4000 cubic yards of gravel per twenty-four hours. The largest yet installed in this State have a limit of 2500 yards. The new ones are of the continuous bucket type, 30 by 80 feet in size and designed to reach thirty feet below water to stack tailings thirty-five feet high. There will then be in the Feather River, near Oroville, five dredges of the Postlethwaite type, two of the scoop type and a continuous bucket dredge of Eastern design.

CALAVERAS COUNTY.

Active operations are being carried on at the Meade gravel mine in the Rich Gulch district. The mine is being worked by the tunnel process and the lead is about ten feet in width. The rock is being crushed in a Bryan roller mill. Steam power is used.

The sinking of the main shaft of the De-marest mine from the 400 foot to the 600-foot level, began on Thursday, and will henceforward be vigorously prosecuted to completion.

Operations have been commenced at the Kramer gravel mine, in Poorman's Gulch. The mine was recently purchased by an English syndicate. The old tunnel is to be cleaned out and retimbered and steel rails will be put down. The present tunnel is in 1800 feet. Lumber has been ordered for the necessary outbuildings and also for a boarding house. As soon as the mine is in proper condition a ten-stamp mill will be erected.

EL DORADO COUNTY.

The Bowler mine has closed down temporarily.

The ten-stamp mill at the Cambrian mine is again running, a full force of men is employed and a large body of ore is being exploited.

It is said that the Indian Diggings Gold Mining Company now has about twelve men in its employ, and that work is progressing steadily at the mine, although the snow interferes somewhat.

Development work at the Pioneer copper mine, near Pilot Hill, is being vigorously prosecuted. Twelve men are now steadily employed and the force will be increased soon. In addition to the copper, which averages over 8 per cent the ore carries good gold and silver values.

KERN COUNTY.

Joseph Schneider of Riverside, who has been out at Randsburg for several weeks past, says Randsburg is booming, and while the rush there and talk over the mines of the camp is

not as great as was the case a couple of years ago, the camp is, nevertheless, a good one, where lots of bullion is being taken out each month.

In the Copper Basin sixteen miles north of Randsburg, the Phoenix Company of Los Angeles, is developing good copper prospects. The company has a force of men at work. On the west side of Wolfskill mountain, a short distance from Copper Basin, the Copper Cliff Company is opening up a number of promising claims.

Judge Davenson of Randsburg has resigned the office of Justice of the Peace and O. J. Doty has been appointed to fill the vacancy. The Judge goes to Jerome, Arizona.

Major Taylor of Red Rock has sold his general merchandise business to J. E. McGinn of Garlock, who is moving the same to the latter town.

The old Visalia mill has been moved from Garlock to Randsburg.

Messrs. Doty and Thomas have finished cyaniding for the present season on Kelsey Creek, and will cyanide 12,000 tons near Tehachapi while their other works are frozen up.

Burcham and Singleton of the Rand Mine have located four sections of oil land on the Northeast slope of Black Mountain, north of the coal mine.

The Yellow Aster Co. of Randsburg are reported to have commenced operations on the old 40-foot well at Goler, with the view of pumping water to the former place.

Both the Southern Pacific and the Santa Fe railroads have surveyors in and around the Garlock part of the desert surveying towards Panamint.

Fresno parties have bonded the coal and copper mines of F. H. Heald for \$56,000.

Mojave is building up rapidly in the burnt district and this time with substantial brick buildings.

The oil boom at Bakersfield and vicinity is taking on colossal proportions and promises to be one of the best oil fields in the State.

The country North and East of Johannesburg is developing very rapidly and the road from that railroad terminus in the aforesaid direction is literally lined with freight teams and prospecting outfits of every description, for Argus Range, Inyo County, Panamint, Ballarat, Borax Lake, and all the camps in that direction.

RIVERSIDE COUNTY.

W. A. Hayt, of Riverside, is developing his Gold Eagle claim, in the mountains west of West Riverside. The property is looking well at present.

Work on the Stanford Mine, in the Pinecate District, near Perris, is being carried on vigorously at present by L. A. Hearne, the owner.

SAN BERNARDINO COUNTY.

As the result of a run of thirty tons of ore a gold brick worth \$800, is reported from ore taken from the O. K. mine at Virginia Dale, and was milled in the ten-ton mill of the O. K. Mining Company. This is not the first bar produced by that company by any means, for the O. K. is one of the mines that is worked for what there is in it and not an assessment or development work, and it is paying the

owners big money. Work is now being done on the 250 foot level, and is showing up in a very satisfactory way.

Last week Joe Lycere and partners, working upon a new discovery called the Good Hope, a claim in the group of the same name at Manvel, including the Robust, Horseshoe, Columbia and Olympia, made a wonderful discovery, the vein being about 30 inches wide and to all appearances a perfect duplicate of the mineral in the Old Shoes Mine, the ore being a quartz studded with sulpho-tellurides.

The Good Hope group of claims has been located less than a month, and at a point about three miles Southwest of Manvel on the West side of New York Peak on the up-raise of the mountain. It is expected \$36,000 in development work will be expended in the near future on this property.

The new strike in the old New York Mine Southwest of Manvel is reported to carry 2100 ounces silver. A carload of this ore was shipped by Wm. Sisty to the reduction works at Barstow last week. The ore is shipped from the old station of Purdy, two miles from Manvel.

The Dead Indian Mine, a new discovery owned by Messrs. Stewart, Cook, and others, located on the North side of Shadow Mountain, Northwest of Manvel.

Copper Camp, near Manvel, is the scene of considerable activity. Mr. Moore is shipping ore from his mines containing copper and gold to Pueblo, Colorado, for reduction which nets about \$1000 per car.

SAN DIEGO COUNTY.

The Boulder Creek Company will incorporate under the laws of Arizona for one million dollars. Their mining location is ten miles from Julian.

The San Diego Chamber of Commerce has added a Mining Department to their rooms. The entrance is on Sixth street, separate from the other exhibit, and now contains a large collection of mineral specimens.

The Dewey Mining and Milling Company, who own a group of mines in the Grape-vine Mining District, have a 150-foot shaft on their property in on a ledge 3 to 4 feet wide, of high grade ore. The following are the officers and directors of this company: George Puterbaugh, Pres., J. A. Heath, Vice-Pres., L. F. Doolittle, Sec'y, W. R. Farnsworth, J. S. Akerman, George M. Hawley, Frank P. Frary.

Quite a stir was made in mining circles by the purchase of five prominent mines, in the Julian District, by D. C. Collier. The mines are the Cincinnati Belle, Gold King, Gold Queen, Gold Rock and Gold Brick. The mines were always considered good property, and mining men state that with proper development they will pay a good dividend. Mr. Collier purchased the property from Fidel Ganahl. The price paid was \$10,000.

Several months ago work was begun on a tunnel to drain the Old Kentucky Mine in the same district, and when it had penetrated the hillside about 300 feet, the results were more than counted upon. It is evident that the tunnel tapped the underground flow that had filled all the mines in that district, and now a constant stream of at least 15 miners' inches of water is flowing out of the tunnel. The water that heretofore stopped operations in the Old Kentucky, Kentucky S, and Cincinnati Belle has disappeared, leaving this group of mines entirely dry.

SHASTA COUNTY.

The Mammoth Copper Mine, in Shasta County, which has been peddled about for a year or so, under a bond held by J. F. Coleman, has reverted to its owners, who will now try to dispose of it.

Under an arrangement made some time ago, Mr. Coleman agreed to pay \$10,000 on Jan. 1, \$40,000 on Feb. 1, and \$50,000 on April 1.

A week ago, Mr. Coleman asked to be allowed to pay \$3,000 on Jan. 5, 47,000 on Feb. 5, and the remainder on April 1.

This proposition the owners refused to entertain, and the Coleman deal is definitely off.

Mr. Coleman has spent \$25,000, he says, on the proposition and is ready to spend \$15,000 more, for he believes in it; but he says that at present he could do nothing under existing conditions in the East unless he could get more time.

TUOLUMNE COUNTY.

Arrangements are being made for sinking the shaft on the Brown Mine to a depth of 1200 feet.

The Santissimo Mine, at Jackass Hill, yielded a \$2500 pocket last week. The mine is being worked by Charles Gillis and Thos. Bluett.

Active work is to be commenced at the Sonora and Duffield Mines, near Aratraville. A Michigan company will furnish the capital.

The Mustang Mine, on Mustang Gulch, about two miles south of Confidence, has been bonded to San Francisco parties, who will commence work upon it at once.

At the Golden Gate Mine, 80 miners are on the pay roll. Drifting and stoping in many parts of the mine constitute the present underground operations. The mill is running full blast, and the famous old property is said to be easily sustaining its good record as a bullion producer.

COLORADO.

During the past twelve months the great Cripple Creek District has produced an even round of \$20,000,000 worth of gold. The camp paid back to investors during that time four and a quarter million dollars in dividends, while undivided profits amounting to that much again remain in the treasury as convenient nest eggs for the next year's accumulation.

During the year the production has increased 100 percent, by the showing made this last month, for it will be recalled that last January the camp produced \$1,500,000 worth of ore; December produced, it is estimated, a round three million dollars. The camp paid out in dividends in December alone over \$1,000,000, which is equal to the amount of dividends paid out the first six months of the year. Another thing is the substantial gain which the year has made in dividend paying over last year. During 1898 the mining companies operating in the Cripple Creek District paid out \$2,590,000 in dividends. During 1899 the dividends reached \$4,250,000 and perhaps close to \$4,500,000, a gain of over 100 percent.

Now departing from the financial side of the case a glance may be taken at the industrial improvements which the year has witnessed. One has but to note the great improvement which has been made at the various mines. The Gold Coin is just completing a \$200,000 plant. The Hall City placer

has completed its \$60,000 plant. The Mary McKinney put up a \$60,000 plant.

The Vindicator Company expended \$40,000 in surface improvements this year. The Isabella Mine installed a \$15,000 plant of machinery, and so the cases of the proportions of the last mentioned improvements could be duplicated many times.

IDAHO.

The McKinley Gold Mining Company, Ltd., filed articles of incorporation. Kellogg is the principal place of business. The Directors are Leonard P. Hyde, George W. Losie, Edward Hearing, Knute Holm, Alexander H. Polson, Henry C. Barnhart and Edwin Franklin. Besides the Directors, the incorporators are Thomas J. Stack, John Holm, Andrew M. Anderson, Nels C. Braham, George W. Starkey and Lewis E. Wanner. The capital stock is \$7,500, divided into 1,500,000 shares, making a par value of one-half cent per share.

MICHIGAN.

Osceola is regarded in nearly every quarter as one of the cheapest stocks now on the bargain counter in the Boston market. Large New York interests identified with the property bought several thousand shares this year at above \$90 per share. There are only 92,000 shares of this stock outstanding. It has been paying \$6 per share from the old mill, while producing 1,000,000 pounds of copper per month.

Within a month it has put into commission a new mill that is in every respect the equal of the old one, and both mills are running. These are fed from three mines, upon the three veins of the Michigan peninsula—the Calumet vein, the Osceola vein and the Kearsarge vein.

Adventure Mine.

Will Leary is working in the Adventure Mine near Hancock and gives a good report of the prospects and says it is a good mine.

They are digging around a mass of copper said to be about eight feet square now. The miners are working on a contract and are making big wages. They are earning about \$4 20 a day, or about \$100 a month.

Shaft No. 1 in the Rhode Island Mine near Hancock is not working, as a new hoist and skip road is being built. They will be similar to those used at No. 7 shaft at the Quincy Mine.

At shaft No. 2 it was first necessary to go through about sixty feet of sand and they are now down about forty feet in the rock. W. H. Mason brought home samples of rock from No. 2 shaft. They were taken at random from a pile excavated from the shaft. They are the best he has seen from any of the new propositions.

He thinks the stock is cheap now and will be a good thing to lay away. The shaft is not deep enough to make a rough estimate of the percentage of the rock, but it is evidently destined to be a profitable mine.

MISSOURI.

The year 1899 was a record-breaker for the Missouri-Kansas Mining District, both in the value of its ore output and in the prices paid for zinc ore, says the *Age of Steel*. It was the greatest in the history of the district, and

witnessed vast and wonderful improvements throughout the district, not only in the methods of mining, but in the building of new mills, and in the use of up-to-date machinery. More than 200 new mining plants were built in the district during the year, an increase of over 50 per cent, and capital from all parts of America sought investment there. Many mining corporations were organized during the year, their capital stock aggregating \$22,606,700. These corporations are all interested in zinc and lead mining in this district, and many of the older ones are paying weekly dividends.

The highest price ever paid for zinc ore was paid during the year just closed, that ore advancing to \$55 a ton, for ore in the bin, last April, and a small lot of fancy ore brought \$55.50 per ton. Zinc ore remained about \$40 until November, when it declined to \$30, but again advanced. The top price paid for this ore last week was \$36.50 per ton, a drop of 50 cents from the preceding week's price. Lead ore was steady at \$27.50 per thousand pounds, the same as for the past four weeks.

During the corresponding week of last year, zinc ore's top price was \$29.50, and lead ore brought only \$22.

Last week's out-put was considerably reduced on account of the holidays which were observed at many of the mines, and the bad condition of the roads prevented a great deal of the ore that was produced from being hauled, hence it does not appear in the week's sales.

	ZINC, LBS.	LEAD, LBS.	VALUE.
District total for last week,	7,955,080	647,300	\$150,556
District total for corresponding week last year,	9,470,060	677,580	\$148,47
District total for 1899.....	515,355,480	48,519,060	\$10,802,47

MONTANA.

Anaconda Copper Company's Smelters.

There are many changes in contemplation, but not much being done outside of routine repairs. Many of the matte furnaces are being so thoroughly overhauled that it amounts to a practical rebuilding.

At these works interest centers chiefly in the new large matte furnaces that have just been built. These are three in number, and they are respectively 31, 35 and 42 feet in length, being uniformly 14 feet wide, both the length and width given being inside measurements.

These are all working well, but the best work relatively is being done by the smallest of the three—the 31-foot furnace. From this furnace some 45 or 50 tons of matte is drawn each 24 hours. It is tapped three times a day and about 15 or 16 tons drawn off at each tapping.

While the two larger furnaces are not doing quite so good work, they are constantly improving, and Captain Kelley, who is in charge of the works, has great hopes of their ultimately and at no distant day, fully equaling in relative efficiency the smaller one referred to.

It is thought that shortly after the first of the year several more of the small furnaces on the lower floor will be torn out and replaced by larger ones similar to the three already described, and that in the end there will be a complete substitution of large furnaces for small ones throughout the entire plant. There are now 23 of these smaller furnaces, their average capacity being about 12 tons of matte per day for each furnace.

The present output of matte per day from this department is about 200 tons, which is

sent directly to the converter, half a mile below, by means of a small electric railway.

Incidentally it may be mentioned that at a very early day changes will probably be made whereby the matte can be taken to the converter in a molten state, instead of pigs or bars, as at present, which will save remelting. The distance between the different parts of these vast works is so great that it has heretofore deterred efforts along this contemplated line, but in the general work of remodeling which is now in progress the purpose seems to be to make improvements wherever feasible.

This immense smelter is equipped with 96 huge Bruckner revolving furnaces for calcining the concentrates before they are sent to the matte furnaces. These Bruckners are about 18 feet in length by 10 feet in diameter, and carry 14 tons of concentrates at a charge.

The purpose of this roasting is to get rid of the most of the sulphur contained in the ore, and it is, in fact, reduced from about 35 percent to 3 or 4.

In this process, as in converting, the sulphur is a valuable agent, uniting with the oxygen of the atmosphere to form a combustion which gives the necessary heat, and makes other fuel unnecessary, except to start the fire.

This is what is called pyritic roasting, one of the most important features of copper smelting.

Sixty of these Bruckners are in the lower building and 36 in the upper.

The sixty lower Bruckners all connect with one great brick stack which stands far up on the hill above the works. This stack is said to be nearly 200 feet high from the base, with an inside diameter of 22 feet. The hill on which it stands is fully 200, and perhaps 300 feet above the valley, so that a total height of the top of the stack must be from 400 to 500 feet. The flue which connects the Bruckners with the stack is 18x20 feet in the clear.

The reader will get a better idea of the size when it is suggested that the flue would hold two trains of Pullman cars side by side.

There are two other brick stacks somewhat smaller connecting with the matte furnaces and the upper Bruckners.

A new mill has just been set up for the grinding of brickbats into clay for general use about the furnaces. The mill is about the same as those in use at the converters the grinders being two large solid iron wheels with eight-inch faces.—*Anaconda Standard*.

NEVADA.

Wm. Yount and Jim Fisk are shipping a very high grade of copper ore from Manvel to the smelter. The ore comes from Good Springs District, Nevada.

NEW MEXICO.

J. M. Wines made the last payment on \$13,000 on the Superior Mine, near Lordsburg, a few days ago. The company has realized sufficient on the ore taken out of the mine during the term of the bond and lease to pay for it. With new hoist and other appliances, the owners will now sink and open other workings.

Some beautiful specimens of gold and copper ore have been taken from the Providence near San Pedro, Santa Fe County. Ore taken from the prospect assays \$38 in gold, and carries a good per cent of copper. Only

33 feet of assessment work has been done, and an offer of \$1,000 has been refused for it.

The Hillsboro District is slowly but surely coming to the front again as a producer of gold. A recent assay of some ore found within a dozen miles of the town showed values amounting to \$56,000 per ton. The tests were made by a well known assayer of Hillsboro, Mr. Preisser.

The owners of the Surprise Mine at Cook's Peak, two weeks ago, opened up a pocket of lead carbonates, which promises to develop into a big strike. The ore body was found close to the Taylor cave. The work of opening up the new body is now under way.

A strike of copper ore was made last week, near Pinos Altos, by Dr. L. B. Robinson and associates in the Pilipino Mine. The vein is fully two and a half feet wide, and the ore assays 9 per cent copper and \$1.20 gold per ton.

SOUTH DAKOTA.

The Homestake-Highland Company has paid a total in dividends of \$8,143,750 since the first dividend was paid. For the year 1899 the sum of \$962,500 was given the stockholders. About 2,800 tons of ore have been mined, and milled daily through the year. Improvements have been made everywhere with the idea in mind of saving the values in the ore. The Highland hoisting plant is practically completed and can be operated from now on. Experiments were conducted during the summer upon the tailings from the mills with the cyanide process and the company was convinced that a large per cent of the remaining values could be saved in this way and a mammoth cyanide plant has been commenced.

State Mine Inspector's Report.

The following are the amounts produced by each of the following companies, as given in the State Inspector of Mines' report for 1899:

Homestake	\$2,684,336
Highland	936,000
Horseshoe	562,000
Holy Terror	900,000
Hidden Fortune	200,000
Golden Reward Chlorination Works	648,000
Blacktail Mines	60,000
Golden Reward Smelter	2,300,000
Rapid City Chlorination Works	24,000
Allen, Small and Associates, Cyanide Plant	19,000
Spearfish Cyanide Plant	63,000
J. R. Mill	6,000
Central City Cyanide Plant	8,000
Cochran Mill	9,000
Placer Mines	12,000
Other Mines and Mills	10,000
Ore Shipped East	700,000
Total	\$8,841,336

UTAH.

Utah's Gold and Silver Product 1869-1899.

YEAR.	GOLD	SILVER
1869.....	\$600,000	
1870.....	300,000	\$1,000,000
1871.....	221,000	2,079,000
1872.....	100,000	2,345,279

YEAR	GOLD	SILVER
1873.....	52,426	3,725,775
1874.....	92,093	3,819,508
1875.....	181,765	2,955,923
1876.....	164,832	3,872,519
1877.....	17,325	4,359,793
1878.....	15,040	4,357,328
1879.....	15,932	3,835,047
1880.....	8,020	3,783,566
1881.....	7,958	5,400,191
1882.....	9,039	5,435,444
1883.....	6,991	4,531,763
1884.....	5,530	5,669,488
1885.....	8,903	5,972,689
1886.....	10,577	5,918,842
1887.....	11,387	6,161,737
1888.....	13,886	6,178,855
1889.....	24,975	7,147,651
1890.....	33,851	8,165,586
1891.....	36,160	8,015,223
1892.....	38,182	8,969,656
1893.....	54,072	7,107,503
1894.....	56,427	6,659,798
1895.....	65,418	8,223,804
1896.....	92,044	8,250,233
1897.....	89,297	6,689,753
1898.....	114,766	6,570,255
1899.....	3,465,320	4,641,748

FOREIGN MINING NEWS

BRITISH COLUMBIA.

NELSON.

The following is the mill run at the Atha basca for one month: Number of days run, 29 days, 3 hours; number of tons crushed, 338.

Value of bullion recovered.....	\$9203 03
Gross value of concentrates recovered.....	2,385 25

Total..... \$11,588 28

Value of bullion recovered per ton of ore crushed..... \$23 72

Gross value of concentrates recovered per ton of ore crushed..... 6 14

Total values recovered per ton of ore crushed..... 29 86

The Custom returns from Nelson for one month include the following exports:

	VALUE.
Coke.....	\$ 339
Lead bullion.....	36,513
Gold bullion.....	48,095

The result of the Hall Mines smelting operations for five weeks are as follows:

Smelter in blast 19 days and 13 hours, during which time 128 tons of Silver King ore (containing approximately 1,540 ounces of silver) and 368 tons of purchased ores were smelted; 103 tons of lead bullion were produced, containing (approximately) 102 tons of lead, 11,330 ounces of silver and 387 ounces of gold.

The output of mines of East and West Kootenay for the eleven months ending November 30th approximates in value \$5,500,000 in gold, silver, lead and copper. The total for the year will be in the neighborhood of \$6,000,000.

SLOCAN.

The exports of ore from the ports of Kaslo during one month made a very insignificant showing, and the aggregate tonnage was less than during any similar period since the construction of the railway in that district. The returns are as follows: 570,585 lbs., containing 298,798 lbs. lead and 16,926 oz. silver.

MEXICO.

Report says that the Captain Mine, in the Gold Gulch District, Sonora, has been sold for \$200,000. This is one of the free-milling gold propositions that has attracted special attention in that section.

The Cananea Consolidated Mining Co., of Sonora propose constructing a grade from their mines to the reduction works some fifteen miles distant. It is also their intention to build a railroad from Naco, Cochise County, Arizona, to their mines, a distance of 40 miles.

Latest Mining Decisions.

Prepared for THE MINING AND METALLURGICAL JOURNAL, by Andrews & Murdoch, Berrien Springs, Michigan. Credit must be given when reprinted.

The owner of a town lot in Alaska, unpatented, may adverse an application for patent for a lode claim, and may maintain an action in a court of competent jurisdiction in support of such adverse. Young et al. vs. Goldsteen, 97 Fed. Rep. (U. S.) 303.

Under Pol. Code, §3612, providing that the declaratory statement containing a description of a mining claim filed with the County Clerk must contain the location and description of each corner, with the markings thereon, a statement describing a claim by metes and bounds, and giving no description of the corners or the markings thereon, is invalid. Purdum vs. Laddin et al., 59 Pac. Rep. (Mont.) 153.

The Act of Congress of May 17, 1884, providing a civil government for Alaska, also provides that "the Indians or other persons in said district shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them, but the terms under which such persons may acquire title to such lands is reserved for future legislation by Congress." By this provision all persons in peaceable possession of lands in Alaska on the date of said act are guaranteed the right to ultimately acquire a perfect title to such lands through such legislation as the Congress may enact for that purpose. Young et al. vs. Goldsteen, 97 Fed. Rep. (U. S.) 303.

Rev. St. § 2324, as amended by Act of Jan. 22, 1880 (21 Stat. 61), provides that the miners of a district may make regulations, not in conflict with the laws of the United States, governing the location, manner of recording, and amount of work necessary to hold possession of a mining claim, subject to the requirement that not less than \$100 worth of labor shall be performed or improvements made during each year until a patent has been issued, and further providing by the amendment that "the period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location on such claim," merely fixes the minimum amount of expenditure exacted by the United States, and the maximum limit of the time within which it may be made, leaving to the States and mining districts to prescribe such further regulations or requirements within such limits as they may deem advisable; and a mining district has power to make a regulation requiring a prescribed amount of work to be done within 90 days after a location is made, and making the claim subject to relocation in default of such

work, notwithstanding the 90 days may expire before the 1st day of January succeeding the date of location. *Northmore vs. Simmons et al.*, 97 Fed. Rep. (U. S.) 386.

A mineral discovery made on free public land, and a claim located thereon, vest in the locators all the free public land within its limits, and every vein whose apex is found within such free public land, within the surface lines of the claim extended downward vertically, whether the surface thus secured is all or only part of the tract within the boundary lines of the claim. *Crown Point Min. Co. vs. Buck*, 97 Fed. Rep. (U. S.) 463.

On page 94 of this issue, in the article "The Metallurgy of Gold," Prof. L. J. Stabler's name was misspelled. Through a typographical error "s" was inserted instead of "r."

The M. C. Bullock Manufacturing Co., of Chicago, has closed orders for hoisting machinery for the Spring Valley Coal Co., and the Spruce Mining Co. It has also sent a diamond drill to Northern Minnesota, and closed a contract for diamond drill prospecting on the Pacific coast of old Mexico.

A close approximate of the Credentials Committee showed that at least eighteen States were represented in the National Convention of the United Mine Workers of America when that body convened in Indianapolis today. The wage question will be the paramount consideration. Some of the districts have already framed their demands.

The following table showing Colorado's mineral production, includes only precious metals and metals carried with them. It does not include iron, etc.

In four of the metals produced from Colorado mines the State presents new records for value. The metals in point are gold, lead, copper and zinc. The exception is silver, which was more affected by the smelter shutdown last summer than any of its sister products, as the shipments of ores from the leading silver districts were almost totally suspended between June 15th and the middle of August.

Gold, 1,515,777 ounces at \$20.67.....	\$31,329,056
Silver, 21,275,532 ounces at 59.6 cents.....	12,680,256
Lead, 54,350 tons at \$85.40 per ton.....	4,641,529
Copper, 11,516,931 pounds at 16.1 cents.....	1,855,226
Zinc and manganiferous iron.....	577,500
Total for 1899.....	\$51,082,567

PERSONAL NEWS ITEMS

H. B. VERCOE, Mining Engineer, is in London, England, on important mining business.

J. R. DILLON, President of the Jerome, Arizona, Copper Company, is examining mining property in Mexico.

T. W. PAYNE, General Manager of the Grand Reef Mine, has returned from New York to Wilcox, Arizona.

JOSEPH S. WOODRUFF is traversing Oregon and Washington, collecting mineral specimens for the Paris Exposition.

CHARLES R. WARDLE of New York is en route home from an examination of mining properties in Northern California.

A. J. BAYS of Juneau has been appointed Deputy United States Marshal at Cape Nome. He will go this winter over the ice.

A. F. HOLDEN, President of the Centennial-Eureka Mining Company, Utah, has gone to Costa Rica to inspect mining properties there.

LEO VON ROSENBERG has returned to New York City from California, after examining mining properties in California, Arizona and New Mexico.

W. M. THORNTON is in San Francisco, en route to Anaconda, Montana, from the Philippines, whose mineral resources he thinks will be worth developing by American miners after peace has been restored.

WILLIAM H. NUTTING of Colorado, will superintend the construction of the pyritic smelter from which the ores of the Bingham Copper and Gold Mining Company at Bingham, Utah, are to be reduced.

FREDERIC KEFFER, representing very large New York interests, is manager of the British Columbia Copper Company, Limited, owning the Mother Lode group of mines in the Boundary Creek District, British Columbia.

R. C. CLUTE, Q. C., acting as special Commissioner for the Dominion Government, has, during the past month, conducted inquiries in Sandon, Nelson, Rossland and other mining centers, respecting the operation of the eight-hour law in the Kootenays, British Columbia.

According to W. A. CARLISLE's first reports the average value per ton of Rossland ores amounted to \$40.69. In 1898 this is given as \$22.80 per ton, and for 1899 it is estimated at \$18.00, though it may reach \$20.00, as the smelter returns will not be completed until February.

EDGAR A. BENNETT, general manager in British Columbia of the Lilloet, Fraser River and Cariboo Gold Fields, Limited, and of the Sunshine, Limited, owning the Silver Cup and adjoining properties in the Trout Lake District, some time ago resigned his position with these companies and is leaving for England on February 1st. M. Bennett's resignation takes effect on the 31st January.

GOVERNOR THOMAS has appointed the following delegates to represent Colorado at the International Mining Congress in Milwaukee, next June: H. A. LEE, W. S. STRATTON, ALVA ADAMS, W. F. BUCKLEY, JAMES DOYLE, JOHN R. MCKINNEY, FRANK M. WOODS, J. F. BURNS, W. S. MONTGOMERY, CLARK W. ROE, VICTOR G. HILLS, C. J. MOORE, A. V. BOHM, C. T. CARNAHAN, HENRY I. HIGGINS, S. J. SULLIVAN, FRANCIS CARNEY, T. S. WALSH, F. H. CANE, GEORGE S. NEWMAN, S. I. HALLACK, FRANK E. WHEELER, D. A. TARRELL, E. J. ELLIOTT, JAMES H. ROBIN, E. G. STOIBER, W. Z. KINNEY, S. V. NEWELL, W. H. GRAVES, CHARLES PAINTER, MEAD HAMMOND, J. A. MINOR.

NEW INCORPORATIONS IN THE MINING AND METAL INDUSTRIES.

CALIFORNIA.

Blue Wing Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: G. F. Beveridge, G. C. Gurnett, W. Wardlaw, T. E. Norris, all of San Francisco; G. H. Waggard, of Alameda.

Sunset Development Co., San Francisco. General mining business. Capital, \$200,000. Incorporators: E. C. Wright, G. T. Klink, F. Walker, W. Surger, Jr., F. A. Douty, all of San Francisco.

Star Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: K. S. Elwood, J. M. Keith, J. J. Mack, C. White, G. G. Carter, all of Bakersfield.

Jose Copper Mining Co., Hollister. General mining business. Capital, \$40,000. Incorporators: G. McConnell, R. Jose, J. Caffney, N. C. Briggs, G. W. Clark, all of Hollister.

Caspian Oil Co., Fresno. Mining business. Capital, \$100,000. Incorporators: C. A. Canfield, J. A. Chancellor, of Coalinga; W. H. McKenzie, T. G. Hart, G. L. Hoxie, J. Streeter, all of Fresno; E. C. Miller, of Visalia, and others.

Keystone Mining Co., Grass Valley. General mining business. Capital, \$25,000. Incorporators: H. A. Fairbanks, J. M. Thomas, J. J. Hosken, W. D. Harris, all of Grass Valley; J. H. English, of Nevada City.

Alma Sola Petroleum Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: T. L. Platt, M. T. Dugan, F. H. Seeley, A. Neilson, C. Bronson, G. A. Treadwell, F. W. Mayberry, all of San Francisco; A. S. J. Woods, of Berkeley.

Juarez Mining Co., Los Angeles. General mining business. Capital, \$200,000. Incorporators: H. T. Duff, J. A. Pirtle, G. Hanna, of Los Angeles; E. A. Phillips, of San Bernardino; S. W. Pearce, of San Diego.

Victory Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: W. B. Lee, W. A. Deane, W. B. Fowler, D. Mackintosh, J. E. Firmstone, all of San Francisco.

Excelsior Oil Co., San Francisco. Oil business. Capital, \$350,000. Incorporators: G. W. Merritt, C. H. Phillips, H. Murphy, E. Lewis, J. W. Wright, of San Francisco.

California Mutual Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: G. M. Perine, W. H. Busch, E. E. Potter, W. S. Pardy, F. Reis, Jr., all of San Francisco.

American Fuel Oil Co., Los Angeles. Mining business. Capital, \$100,000. Incorporators: G. Easton, G. D. Easton, W. L. Valentine, E. H. Groemen-dyke, C. A. Welte, all of Los Angeles.

Pacific Oil Mining and Development Co., San Francisco. Capital, \$500,000. Incorporators: F. Cutting, F. P. Cutting, both of Oakland; G. C. Alferitz, A. D. Cutter, C. F. Jackson, all of San Francisco; T. H. Ganeard, F. E. Lane, O. T. Henderson, all of Stockton; J. P. Iscart, of Los Angeles.

Sunset Oil Mining and Development Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: A. J. Rausch, R. Schult, G. C. Alferitz, A. Rusch, all of San Francisco; P. L. Cavala, J. P. Iscart, of Los Banos; F. Cutting, of Oakland.

Lincoln Gold and Silver Mining Co., Grass Valley. General mining business. Capital, \$50,000. Incorporators: J. R. Tyrrell, J. H. Coughlin, of Grass Valley; P. McAusland, J. V. Snyder, of Nevada City; F. A. Sieke, of Sacramento.

Michigan Bluff Mining Co., Auburn. General mining business. Capital, \$36,000. Incorporators: M. T. Lawrence, W. B. Lardner, R. F. Burns, W. J. Burns, all of Auburn; W. H. Burns, I. A. Burns, of Michigan Bluff.

Equitable Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: M. A. C. Christiesin, J. Karstensen, J. H. Sayre, L. Bowles, C. Bone, all of San Francisco.

Hidden Treasure Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: G. C. Higgins, H. F. Heart, B. D. Kimmons, W. W. Kaufman, all of San Francisco; C. H. Wiggoner, of Alameda.

Westlake Rommel Oil Co., Los Angeles. Mining business. Capital, \$250,000. Incorporators: H. W. Westlake, J. Rommel, B. Kohlmeier, B. M. Marble, all of Los Angeles; A. Gardner, G. P. Phibbs, of Colegrove.

Orange County Oil Co., Santa Ana. Mining business. Capital, \$60,000. Incorporators: I. E. Stanley, B. C. Baker, J. P. Williams, D. J. Hoge, all of Villa Park; R. Y. Williams, W. A. Beckett, both of Santa Ana.

Ninety-Nine Oil Co., Oakland. Mining business. Capital, \$100,000. Incorporators: M. McWhorter, of McKittrick; S. Gale, of Berkeley; D. D. Stark, A. J. Samuel, J. A. Stroud, W. E. Knowles, Jessie B. Stroud, all of Alameda; J. M. Bartlett, of Oakland.

Marietta Oil Co., Oakland. Mining business. Capital, \$5,000. Incorporators: M. McWhorter, C. E. Brisco, of McKittrick; A. J. Samuel, of Alameda; W. E. Knowles, L. J. Shuman, both of Oakland.

Pennsylvania Consolidated Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: J. H. Dieckmann, of Oakland; J. Simon, B. F. Beck, J. B. Toplit, all of San Francisco; B. F. Shepherd, of Fresno.

Tres Sierritas Oil and Mining Co., Lemoore. Mining business. Capital, \$600,000. Incorporators: A. McGlashen, J. J. Smith, L. H. Brown, H. Jenkinson, J. Freer, T. Finnane, K. W. Jones, all of Lemoore.

Sunrise Oil and Mining Co., Bakersfield. Mining business. Capital, \$100,000. Incorporators: E. J. Emmons, C. Scribner, E. R. Guild, Mrs. E. M. Kernard, E. B. Davis, L. M. Underwood, J. Jemenes, C. Lorenson, J. Elder, E. C. Kane, W. H. Emmons, all of Bakersfield.

Americus Gravel Mining Co., San Francisco. Mining business. Capital, \$200,000. Incorporators: S. L. Leszynsky, F. W. Page, F. L. Leszynsky, M. J. Koshland, G. Leszynsky, all of San Francisco.

Sacramento Land and Development Co., Sacramento. Mining business. Capital, \$9,000. Incorporators: M. J. Curtis, J. L. Gillis, F. W. Whitmore, J. J. Henderson, J. H. Batcher, C. K. Lipman, R. M. Richardson, all of Sacramento.

Sparks Mining Co., San Francisco. Mining business. Capital, \$1,000,000. Incorporators: T. J. Sparks, H. E. M. Sparks, J. Curtin, W. J. Bartnett, S. Goodenough, all of San Francisco.

Commodore Gold Mining Co., Stockton. Mining business. Capital, \$100,000. Incorporators: E.

Bignell, of Lincoln, Neb.; F. Y. Robertson, of Kearney; L. R. Robertson, W. M. Garnett, P. B. Spears, all of Los Angeles.

Zubiate Mining Co., San Francisco. Mining business. Capital, \$2,000,000. Incorporators: D. E. Oliver, H. A. Belhume, J. P. Pryor, all of San Francisco; A. Thornton, of New Hope; W. G. Langdon, of Oakland.

Ritter Quartz Mine, San Francisco. Mining business. Capital, \$100,000. Incorporators: M. C. Rigney, I. Thexton, both of Oakland; R. H. Daley, P. I. Rigney, J. Thexton, all of San Francisco.

Fresno County Oil Co., Selma. Mining business. Capital, \$300,000. Incorporators: J. Brownstone, H. E. Corbett, A. B. Armstrong, A. M. Troy, E. H. Tucker, all of Selma, and others.

Highland Oil Co., Fresno. Mining business. Capital, \$200,000. Incorporators: T. G. Hart, L. L. Cory, A. Harvey, P. A. Hearst, T. M. Martin, J. A. McClurg, Sr., Susan I. Braly, E. H. Clark, all of Fresno; F. Clark, H. A. Whitley, both of San Francisco.

National Oil Co., Oakland. Mining business. Capital, \$100,000. Incorporators: W. C. Beatie, W. E. Knowles, L. J. Shuman, J. B. Stroud, all of Oakland; J. H. Wood, of Stockton.

River View Oil Co., Santa Cruz. Mining business. Capital, \$50,000. Incorporators: J. M. Martin, of Fresno; J. R. Martin, J. H. Logan, H. Holway, H. E. Irish, all of Santa Cruz.

Salmon River Consolidated Gold Mining Co., San Jose. Mining and milling business. Capital, \$50,000. Incorporators: G. Roberts, W. M. Cooper, W. A. Cooper, H. J. Sheldon, W. Gussfeldt, S. R. Johnson, all of San Jose; E. E. Potter, of San Francisco.

Union Exploration Co., San Francisco. Mining and milling business. Capital, \$200,000. Incorporators: C. C. Leavett, W. C. Leavett, W. H. Sigourney, J. H. Boden, all of San Francisco; H. Endey, of Jackson.

COLORADO.

Columbia and Cripple Creek Mining Co., Colorado Springs. Mining business. Capital, \$2,050,000. Incorporators: H. C. McCreery, F. J. Steinmetz, A. B. Brisbur, J. C. Plumb, F. H. Heribert, E. T. Creighton, B. E. Nichols, W. R. Barnes, all of Colorado Springs.

Caribou Mining Co., Leadville. Mining business. Capital, \$100,000. Incorporators: W. B. Page, K. L. Fahnestock, S. W. Mudd, all of Leadville.

Little Richard Co., Milwaukee, Wis. Mining business. Capital, \$2,000,000. Incorporators: W. A. Starke, of Milwaukee; J. D. Caldon, J. J. Webber, both of Colorado Springs; A. L. Enright, of Idaho Springs; O. A. Fincke, of Milwaukee, Wis.

Gravel Mountain Gold Mining and Placer Co., Boulder. Mining and placer business. Capital, \$75,000. Incorporators: W. G. Houston, C. G. Maynard, R. T. Fulton, all of Boulder.

Coppertown Mining and Smelting Co., Denver. Mining and smelting business. Capital, \$250,000. Incorporators: A. L. Briggs, W. S. Martin, H. Potvin, all of Denver; F. Bridges, C. H. Street, T. W. Meade, all of San Francisco.

Providence Mining Co., Buena Vista. Mining business. Capital, \$100,000. Incorporators: G. Robinson, of Turret, Col.; E. T. Petty, of Barre, Vt.; E. B. Petty, J. B. Garretson, B. C. Miller, all of Buena Vista.

Pilgrim Gold Mining and Milling Co., Leadville. Mining business. Capital, \$50,000. Incorporators: J. C. Stephens, F. E. Bouck, I. H. Shelton, Alice W. Tiffany, D. Bonner, all of Leadville.

San Fernanda Mining and Milling Co., La Veta. Mining business. Capital, \$100,000. Incorporators: W. C. Fowler, S. E. Hoge, L. Capro, all of La Veta.

Lucky Leasing Co., Denver. Mining business. Capital, \$2,000. Incorporators: L. A. Hayes, F. E. Gregg, G. A. Yarger, all of Denver.

Blake-Harvey Mining Co., Leadville. General mining business. Capital, \$50,000. Incorporators: H. M. Blake, A. S. Harvey, F. K. Porter, all of Leadville.

Live Wire Mining Co., Colorado Springs. General mining business. Capital, \$1,500,000. Incorporators: C. Hill, G. S. Parker, both of Colorado Springs; J. Wood, of St. Louis, Mo.

Parral Milling Co., Denver. Milling business. Capital, \$300,000. Incorporators: B. Gilpin, Jr.; J. F. Hopkins, A. B. Seaman, N. H. Emmons, J. M. Bottello, all of Denver.

Bourbon Lead & Zinc Co., Denver. Lead and zinc mining. Capital, \$40,000. Incorporators: I. N. Ury, W. Chenault, D. F. Campbell, J. V. Stacy, J. W. Tate, H. W. Pond, H. B. Adams, all of Denver.

Silver Lake Milling & Mining Co., Boulder. Mining business. Capital, \$200,000. Incorporators: W. F. Stewart, D. C. Hewitt, E. P. Nellis, all of Boulder.

Aburdix Gold Mining & Milling Co., Pueblo. Gold mining business. Capital, \$1,000,000. Incorporators: G. W. Avery, S. J. Burns, J. R. Dixon, W. C. Poshon, L. A. Winters, B. Bergerman, G. G. Withers, all of Pueblo.

Arapahoe Gold & Copper Mining Co., Denver. Gold and Copper Mining. Capital, \$600,000. Incorporators: L. D. Longhi, W. B. Harrison, J. S. Riggs, D. M. Kennedy, B. B. Clapp, all of Denver.

DELAWARE.

Silver King Gold Mining and Milling Co., Wilmington. Mining business. Capital, \$500,000. Incorporators: J. W. Royer, A. Stewart, both of Spokane; F. S. Myers, W. J. Payne, A. W. Winn, all of Richmond, Va.

Algoma Mining Co., Wilmington. General mining business. Capital, \$200,000. Incorporators: O. H. Scheidemantel, of Staten Island; J. Bamford, of Brooklyn; E. P. Burrill, of Westfield, N. J.; J. L. Coverhill, of Toronto, Canada.

Hamilton Mining & Milling Co., Dover. Mining and milling business. Capital, \$100,000. Incorporators: C. V. Hamilton, L. C. Hamilton, H. H. Newton, all of Pittsfield, Mass.

Gold Pan Mining Co., Wilmington. Mining business. Capital, \$1,250,000. Incorporators: McGeorge Bundy, S. A. Sears, C. L. Lockwood, P. H. Travis, all of Grand Rapids, Mich.; M. E. Smith, of Wilmington, Del.

Anglo-Columbian Exploration Co., Dover. Mining business. Capital, \$5,000,000. Incorporators: E. M. Heary, J. J. Roach, both of Brooklyn, N. Y.; J. L. Wolcott, of Dover, Del.

ILLINOIS.

Indian Mining Co., Chicago. Mining business. Capital, \$2,500. Incorporators: C. E. Hallstrom, T. Cullotin, H. Magnus, all of Chicago.

Tropic Mining Co., Chicago. Mining and milling business. Capital, \$2,000. Incorporators: L. L. Smith, A. J. Rooney, J. J. Rooney, all of Chicago.

Marshall Mining & Milling Co., Chicago. Milling and mining. Capital, \$15,000. Incorporators: F. M. Abbott, F. Marshall, M. E. Cooke, all of Chicago.

MAINE.

Aztec Gold & Copper Mining Co., Waterville. Mining business. Capital, \$2,000,000. Incorporators: D. W. Williams, of Glastonbury, Ct.; C. A. Holland, of Quincy; T. Wentworth, H. F. Doble, W. W. Brookings, all of Boston; F. E. Chandler, of Medford; L. B. Jordan, of Malden; C. W. Davis, of Waterville.

Big Cottonwood Copper & Gold Mining Co., Portland. Mining business. Capital, \$1,500,000. Incorporators: N. Tremick, of Salt Lake City; W. L. Pratt, of Melrose, Mass.; C. H. Talman, of Portland, Me.

MISSOURI.

Helmet Mining Co., Kansas City. Mining business. Capital, \$25,000. Incorporators: K. B. Armour, L. E. James, C. S. Pitkin, F. Hagerman, all of Kansas City, Mo.; C. W. Armour, of New York.

Baltimore Mining Co., Kansas City. Lead and zinc mining. Capital, \$2,500. Incorporators: W. W. Fagan, H. G. Wilson, C. J. Trowbridge, J. C. Wingert, C. J. Simpson, all of Kansas City.

United States Lead & Zinc Mining Co., St. Louis. Mining and smelting. Capital, \$100,000. Incorporators: Mary E. Leahy, D. P. Leahy, A. R. Schrollmeyer, C. Mueller, C. C. English, C. Hamilton, all of St. Louis.

A Number One Mining Co., Joplin. General mining business. Capital, \$200,000. Incorporators: G. E. Starr, T. Morgan, J. H. Myers, all of Joplin, Mo.; C. W. Thomson, of St. Clair, Mich.; A. L. Johnson, of Kansas, Ind.

Saw Tooth Placer Mining Co., Kansas City. General mining business. Capital, \$300,000. Incorporators: H. J. Prange, of Chanute, Kan.; L. E. Moses, of Pueblo, Col.; W. A. Moses, S. E. Moses, W. M. Rynerson, all of Kansas City.

Batavia Mining Co., Carthage. Mining business. Capital, \$50,000. Incorporators: R. F. Glenn, F. G. Stuart, all of Carthage; T. C. Moulding, E. A. King, both of Chicago, Ill.; I. S. Stephens, H. N. Wade, both of Batavia.

Regina Lead & Zinc Mining Co., Joplin. Lead and zinc mining. Capital, \$20,000. Incorporators: J. R. House, of Joplin; G. Campbell, A. W. Imrie, A. D. Holmes, J. F. Hartz, W. T. Metcalf, all of Detroit, Mich.

East Sherwood Lead & Zinc Co., Joplin. General mining business. Capital, \$100,000. Incorporators: W. W. Gregg, L. P. Cunningham, T. Dolan, all of Joplin; C. W. Somers, of Cleveland, O.

NEW JERSEY.

Catana Placer Mining Co.—Principal office, No. 86 Montgomery Street, Jersey City, N. J. Mining. Capital, \$100,000. Incorporators: Edgar L. Brown, John B. Berthoff, Michael I. Fagen, all of Jersey City.

Mount Moriah Mining Co.—Principal office, New Jersey Registration & Trust Co. Building, East Orange, N. J. Mining. Capital, \$125,000. Incorporators: S. E. McDowell, W. F. Kaplmyer, W. C. Jones, S. F. Bevier, C. N. Andrews, C. N. Cameron, Franklin Ely, D. R. Campbell, F. M. Chapman, Andrew Nelson.

NEW YORK.

Mariana Mining Co., New York City. Mining business. Capital, \$100,000. Incorporators: A. M. Sayer, Mary M. Sayer, F. R. Steven, C. A. Burbank, all of New York City; M. H. Goodwin, of Brooklyn.

Camden Mining Co., New York City. Mining zinc, etc. Capital, \$15,000. Incorporators: W. J. Wilkes, of Kansas City, Mo.; E. T. Brookman, W. E. Kesselburgh, Jr., both of New York City; H. Bronk, of Albany.

OHIO.

A. R. Elson Co., Magnolia. Milling business. Capital, \$20,000. Incorporators: A. R. Elson, Margaret E. Elson, J. R. Elson, F. Elson, R. R. Elson.

Pittsburg-Ohio Coal Co., Cleveland. Mining business. Capital, \$10,000. Incorporators: H. B. McGraw, E. M. Grovemyer, H. C. Fosel, L. M. Hildereth, J. W. Hart.

TENNESSEE.

Hewassee Mining Co., Knoxville. General mining business. Capital, \$5,000. Incorporators: C. A. Weller, H. V. Maxwell, J. A. Fowler, W. Taylor, E. T. Sanford, all of Knoxville.

WEST VIRGINIA.

Binghamton Zinc and Lead Mining Co., Binghamton, N. Y. Mining and milling business. Capital, \$1,000,000. Incorporators: E. F. Jones, M. W. Scott, J. W. Cobb, O. E. Briggs, M. A. Miller, all of Binghamton.

Grafton Mica Milling and Manufacturing Co., Boston, Mass. Mining and manufacturing business. Capital, \$100,000. Incorporators: E. D. Harris, of Reading; C. F. Woodward, A. E. Stone, of Wakefield; S. E. Knight, of Lynn; F. E. S. Robbins, of Melrose.

Glade Creek Coal Co., Charleston. General coal and coke business. Capital, \$5,000,000. Incorporators: C. E. Platt, F. Maurer, E. Daly, W. J. Jackson, A. T. Dukes, all of Philadelphia.

Chicago & Sitka Gold Mining & Milling Co., Chicago, Ill. Mining and milling business. Capital, \$2,000,000. Incorporators: H. A. Bauer, of Seattle, Wash.; J. W. Lowenthal, C. C. Moeller, A. H. Wolf, S. Stein, all of Chicago, Ill.

Alaska & Northwest Exploration Co., New York City. Mining and milling business. Capital, \$5,000,000. Incorporators: J. R. Jeene, M. S. Bowell, T. J. Taylor, of Cedarhurst; B. M. Baruch, C. B. Davidson, of New York City.

Digby Mill & Mining Co., Joplin, Mo. General mining and milling business. Capital, \$200,000. Incorporators: H. J. Mendel, G. T. Digby, J. Crackard, A. S. Hare, all of Wheeling; E. M. Statler, of Buffalo, N. Y.; W. J. H. Bown, of St. Louis.

Pittsburg Mexican Mining Co., Pittsburg. Mining and milling business. Capital, \$1,000,000. Incorporators: T. H. Lohr, H. Lively, M. G. Livingston, W. C. Lilly, T. R. Kenney, all of Pittsburg.

Missouri Zinc & Lead Concentrates Co., Springfield, Mass. Mining and milling business. Capital, \$400,000. Incorporators: Laura Newman, R. P. Alden, H. Bowman, F. T. Ley, E. A. Carter, all of Springfield, Mass.

Westchester Zinc & Lead Co., White Plains. Mining and milling business. Capital, \$150,000. Incorporators: H. T. Jennings, E. C. White, both of Mt. Vernon; J. W. Lounsbury, of Portchester; J. H. Moran, of White Plains; W. R. Bull, of Harrison.

Sagamore Zinc & Lead Co., Galena, Kan. Milling and mining business. Capital, \$500,000. Incorporators: B. Pitman, F. M. Smith, both of Lynn, Mass.; L. F. Mendall, of Wrentham; I. S. Franklin, G. H. Drew, both of Boston.

Hampton Zinc & Lead Co., Springfield. Mining and milling business. Capital, \$150,000. Incorporators: E. A. Snowman, J. F. Carman, T. G. O'Connell, G. C. Tait, N. E. Russell, all of Springfield, Mass.

The Mining And Metallurgical Journal

THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

METALS.

The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER.	COPPER.	LEAD
Jan. 1	58 1/4	16 50	4 75
" 2	58 1/4	16 50	4 75
" 3	59	16 50	4 70
" 4	59	16 50	4 70
" 5	59 1/4	16 50	4 70
" 6	59	16 50	4 70
" 8	59	16 50	4 70
" 9	59	16 50	4 70
" 10	58 1/4	16 50	4 75
" 11	58 1/4	16 50	4 75
" 12	58 1/4	16 50	4 75
" 31	58 1/4	16 50	4 70
" 41	58 1/4	16 50	4 70

SILVER

The Silver market has been steady and dull showing only small fractional changes during the week and closing at 26 3/4 d. in London.

COPPER.

Prices remain unchanged from those quoted last week. Lake copper 18 1/2 c, Electrolytic in cakes, wirebars and Ingots 17 @ 17 1/4. Cathode 16 3/4 @ 16 1/2 c, casting copper 17 c nominal. The foreign market is still dominated by difficulties betw. England and Transvaal. London

is quoted, English tough £78, 15s @ £79 5s, best selected £80 5s @ £80 15s. India sheets £83 @ £83 10s.

LEAD.

Lead continues in good demand and with no change in prices. New York being quoted at 4.55 @ 4.60c.

The foreign market has been irregular but the tendency is upwards. Spot is quoted at £15 17s 6d @ £16 2s 6d for Spanish and £16 5s @ £16 7s 6d for English, while futures are at a discount of 5s to 10s.

SPELTER.

The disquieting news from the ore-fields stirred up consumers and a good business has resulted at stiffening prices, New York is quoted at 5.45 @ 5.50.

The foreign market is also firmer and again higher good ordinaries being quoted at £22 12 6d, Specials £22 17s 6d.

ANTIMONY.

Antimony is in good demand. We quote Cooksons at 10 1/4 @ 11c, Hallett's at 9 3/4 @ 9 1/2 c, U. S. Star and Hungarian 7 1/2 @ 9 1/2 c.

NICKEL.

Nickel continues unchanged and no alternation of prices can be reported. We quote for ton lots 33 @ 36c per lb., and for smaller orders 35 1/2 @ 38c. London prices are 14 @ 16d. per lb., according to size of order.

TIN.

It is quite natural that this article, which is always volatile should suffer in consequence of the unsettled state of affairs abroad and the higher money market. Fluctuations have been rather wide but the close is again firm at £145 15s for spot and £146 2s 6d for three months.

In New York the buying was restricted

to quantities needed to cover immediate requirements although consumption continues at a fair rate. We quote Straits in carload lots at 32 1/2 c f. o. b. New York.

PLATINUM.

The demand for Platinum is good and prices are firmer. New York is quoted \$17.75 per ounce for large lots and \$18 for smaller orders.

POTASSIUM CYANIDE.

Purified, 98 @ 99 per cent., in cases of 120 lb. at 30c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

QUICKSILVER.

The wholesale price in New York has advanced \$1 and is now \$48.00 per flask. The London price has risen to £8 17s 6d per flask, with the same rate from second hands.

THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum:	
No. 1, 99 per cent. Ingots, per lb.	35 @ 37c
No. 2, 99 " " " "	31 @ 34c
Rolled sheets, per lb.	38c. up
Aluminum—Nickel, per lb.	33 @ 39c
Alum-bronze, " " "	36 @ 25c
Bismuth, per lb.	\$1.45 @ \$1.50
Phosphorus, per lb.	48 @ 50c
Magnesium, " " "	\$2.75 @ 3.00
Tungsten, per lb.	70c
Ferro-tungsten, 60 per cent.	60c

Variations in price depend chiefly on the size of the order.

ACIDS.

Acetic is in good request, muriatic is moving briskly on contract, and sulphuric is unchanged. Blue vitriol is quiet. Only 50 bbls. oxalic acid were imported this week.

The exports from the United States in August amounted to \$12,653.

BRIMSTONE.

There are no arrivals. Spot best un-mixed second \$22 @ \$22.50 per ton and shipments \$21.15; thirds, \$19. The imports of brimstone into the United States in August were 11,109 tons.

NITRATE OF SODA.

Demand is very quiet and quotations for all positions are nominally \$1.65 per 100 lbs. Odd lots can doubtless be had at \$1.62 1/2. The United States imported 18,708 tons nitrate of soda in August.

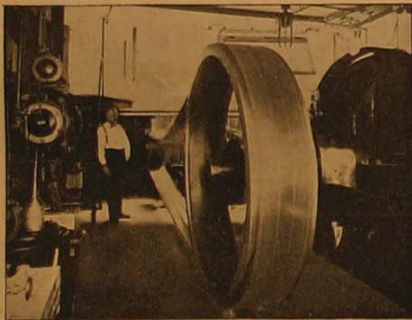
CHEMICALS

Most of the business done in heavy chemicals is for future delivery, the little doing on spot being at advanced prices. Imports this week included 200 drums, 210 casks and 2 bbls. bleaching powder. Importers expect a curtailment of shipments from England When the Boer war is on, as the merchant vessels will be used for transporting troops to South Africa. Receipts of domestic goods at New York last week included 1055 sacks alkali and 250 drums caustic soda.

Caustic soda high test is quoted per 100 lbs. f.o.b. works at 1.77 1/2 @ 1.82 1/2; in New York, \$1.85 @ \$1.90. Bi-carbonate of soda is quoted per 100 lbs. f.o.b. works, \$1.12 1/2 @ \$1.25. Chlorate of potash crystals in New York are quoted for domestic, \$8.75 @ 9.00; foreign, \$9.25 @ 9.37 1/2; powdered domestic at \$9.25 @ 9.50, and foreign, 9.50 @ 9.75.

CHLORIDE OF LIME.

English prime brands are quoted at 1.65 @ 1.75 with 1.50 @ 1.60 for other brands.



BROWN, DURRELL & CO.

CLING-SURFACE MFG. CO.,
BUFFALO, N. Y.

BOSTON, MASS., Aug. 1, 1899.

DEAR SIR:—Having tried Cling-Surface on my 12" dynamo belt (16 feet between centres), I have been able to carry full load with 22" sag on belt with no perceptible slip. It surpasses my expectations and I can recommend it to do all that is claimed for it, if directions are followed.

Yours respectfully, E. B. PRESCOTT, Engineer.

this Belt was as tight as a fiddle string, under about 1000 lbs. initial tension and yet was slipping. There is no slip now for it runs slack. CLING-SURFACE did it.

CLING-SURFACE MANF. CO.,

167-172 VIRGINIA ST., BUFFALO N. Y.

Represented in Salt Lake City by the UTAH RUBBER & MANF. CO.

First Quality in all Lines

Mining Machinery AND Supplies



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HOISTS
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ENGINES
HOISTS
AIR COMPRESSORS
PUMPING PLANTS

Our Compined Geared Gasoline Engine and Hoist, and Combined Gasoline Engine and Air Compressor Especially adapted for Mining Purposes.

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Fairbanks, Morse & Co.,

Chicago, Cleveland, Cincinnati, Louisville, Indianapolis, St. Paul, Minneapolis, St. Louis, Kansas City, Omaha, Denver, San Francisco, Los Angeles, Portland, Oregon.

FINANCIAL NOTES.

AVERAGE PRICES OF METALS.
in New York per 100 lbs. from January 1st, 1899:

Month	Copper	Tin	Lead	Spelter
January	14.75	22.48	4.18	5.34
February	18.50	24.20	4.49	6.28
March	17.54	23.82	4.37	6.31
April	18.03	24.93	4.31	6.57
May	18.25	25.76	4.44	6.88
June	17.93	25.85	4.42 1/2	5.98
July	18.33	29.63	4.52	5.82
August	18.50	31.53	4.57	5.65
September	18.46	32.74	4.58	5.50
October				
November				
December				

AVERAGE MONTHLY PRICES OF SILVER.

In New York per ounce Troy, from January 1st, 1899, and for the years 1898 and 1897:

Month	1899	1898	1897
January	69.86	66.77	64.79
February	69.42	66.07	64.67
March	69.64	64.90	63.06
April	60.10	66.02	61.85
May	61.23	66.98	60.42
June	60.43	68.61	60.10
July	60.26	69.06	59.61
August	60.00	69.54	59.19
September	58.89	60.68	58.24
October		60.42	57.57
November		60.60	57.91
December		59.42	58.01
Year		58.26	59.79

MONEY IN CIRCULATION.

Comparative statement of the circulation in the United States on Oct. 1st 1899. Comparison being made with statement on September 1st, 1899.

	October 1st, 1899	September 1st, 1899
Gold	\$46,561,185 D.	\$26,372,007
Silver	142,801,095 I.	5,356,932
Legal Tenders	314,954,600 I.	4,824,179
Treas'y & N'U B'k Notes	329,688,956 D.	483,165
Totals	\$1,434,014,745 D.	\$16,634,061

Gold and Silver certificates and currency are not included in this table. By adding the amounts given in this table

with those in the following will give the total amount coined or issued. The figures herewith are furnished by the Bureau of Statistics Treasury Department.

MONEY IN TREASURY.

Comparative statement of changes of money in United States Treasury on Oct. 1st 1899, comparison being made with statement, on Sept. 1st, 1899.

	October 1st, 1899	September 1st, 1899
Gold	\$122,271,989 I.	\$128,285,225
Silver	415,844,704 D.	4,650,483
Legal Tenders	31,726,416 I.	4,824,179
Treas'y & N'U B'k Notes	4,850,547 I.	354,491
Totals	\$673,693,656 I.	\$2,163,057

The Gold and Silver bullion on hand in the Treasury is not included in this statement.

GOLD AND SILVER EXPORTS AND IMPORTS.

At all United States ports, for the month of September, 1899, and 9 months ending September, 1898, and 1899:

	SEPTEMBER, 1899	SEPTEMBER, 1898
Gold—		
Exports	\$ 3,102,810	\$ 618,995
Imports	16,808,341	2,593,894
Excess	\$13,705,531	\$ 1,974,899
Silver—		
Exports	\$5,152,103	\$3,622,041
Imports	2,000,696	2,376,846
Excess	\$3,151,407	\$ 1,245,195

NINE MONTHS ENDING AUGUST.

	1898	1899
Gold—		
Exports	\$12,781,923	\$32,877,838
Imports	127,343,816	34,268,421
Excess	\$114,561,893	\$ 1,399,583
Silver—		
Exports	\$39,431,500	\$38,738,431
Imports	21,099,224	22,724,095
Excess	\$18,332,276	\$ 16,014,336

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

The Cleveland Mining and Stock Exchange Co.

New England Building, Cleveland, Ohio.

A Reliable Information Bureau for Miners and Investors to obtain FACTS Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

Morgan-Watson Mining and Construction Co.

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MINES AND STOCKS
We Buy, Sell, Lease and Bond Mines of all kinds.
We Buy, Sell, and Negotiate sales of mining and other stocks.
We Furnish Machinery to work good mines under special arrangement.
We Furnish Capital to develop mines.

WANTS

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers.
Other than above \$1.00 per month.
Advertisements not accepted for less than one month.

COPPER MINE. State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,
JAMES HOWARD,
Care The Mining and Metallurgical Journal,
32 Broadway, New York, N. Y.

GOLD mine anywhere in *United States*, must have at least 1000 feet of *development*; where coal is *not over \$6.00 per ton* or wood \$4.00 per cord *delivered*; plenty of *water*; no objection to *low grade* ore if profit can be made by having *large plant* to *amalgamate and concentrate*; want 6 months *working bond*; no *property* considered unless *owners* are prepared to deposit *certified check* for expenses of *engineer* if *property* is not as *represented*. Address with *price and full particulars*
J. E. M., Mining and Metallurgical Journal,
32 Broadway, New York, N. Y.

EXPERIENCED man desires position, who can install, run and keep in repair, Steam, Electrical and Mining machinery, has knowledge of assaying and office work. References Address: W. H. K., McCLOUD, CAL.

PRACTICAL young assayer desires position as assistant assayer or helper around mill. Best of reference if desired. Address,
ALBERT GUY,
Y. M. C. A., 209 S. Broadway, Los Angeles, Cal.

Gold, Silver, Copper, Zinc and Lead Mines.
Partner wanted who would invest \$20,000 in developing a large Mining property located in the Territory of Tepic, Mexico, on the Pacific Coast. Gold mines ore averages from 3 to 30 oz. per ton of 2000 lb., Silver from 1 to 38 kilo, Lead from 15 to 30 per cent., Zinc from 20 to 25 per cent., Copper from 5 to 25 per cent. Reports, Maps and Samples sent on application. Waterfalls 500 ft. and sufficient timber close to the mines. Call or address,
ELIAS GALINDO,
94 Turbide St., Tepic, Mexico.

NOTICE TO STEAM USERS.

The National Association of Stationary Engineers is prepared to furnish Engineers of guaranteed ability for any plant in the city or elsewhere. Give us a call.
Address: J. T. CHAMBERS, Sec'y,
Engine Room City Hall,
Tel. Main 557. Los Angeles, Cal.

WANTED POSITION by experienced Amalgamator and general Mill man. Have worked in the largest mill on Pacific Coast and Mexico, speaks Spanish, highest references. Apply Con. C. W. Geoghegan Assay Office, 956 3rd St., San Diego Cal.

FOR SALE

WILL GIVE one-half interest in a group of five gold claims in the desert for parties who will put up mill and Cyanide plant. Address,
"J. G. B."
Journal Office, Los Angeles, Cal.

A LARGE Gold deposit, will average \$15.00 free gold suitable for Cyanide Process. Twelve miles from Railroad, in Arizona. Terms reasonable.

H. P. DURRELL,
El Paso, Texas.

REMAIN Two Stamp Steam Mill at Tucson, Arizona. 12-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DREDGING MINING MACHINERY CO. Kansas City, Mo.

CONTRACTOR'S PLANT FOR SALE.

85,000 feet Wire Rope, all sizes, for Hoisting and Guy use; 200 Army Tents; plain Slings; Manila Rope; Iron Blocks; Iron Shackles. These goods have only been used a few days. Can be bought cheap.
EDWARD J. KANE,
260 Front St., New York City.

CHEMIST, 5 years training and knowledge of Mineralogy, desires position with prospecting party or as assistant in laboratory. Highest endorsements. Address,
J. W. FELL,
Ashville, N. C.

FAKE CAPE NOTE
TRANSPORTATION or Mining Companies and Information Bureaus are always exposed in "INDUSTRY & MINING." It is the official paper of the Alaska Miners' Association—better take it for three months and keep posted on the Mining Industry of the Northwest. Only 50 cents. W. J. HOMER, Publisher,
18 Colman Building, Seattle, Wash.

FOR SALE AT A BARGAIN.
A 60-TON copper Smelting Plant, consisting of two 30 ton furnaces, one of which has new seamless liner. Plant is complete in every detail. Also an 80-ton Silver-Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Enquire of GARDNER, WORTHEN & Goss, dealers in Mining and Mill Supplies, Tucson, A. T.

JAMES IRVING & CO. REFINERS ASSAYERS

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Mint Prices paid for Gold and Silver Bullion. Returns made within four hours after receipt.

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Combination Melting and Muffle

Assayers' Furnaces

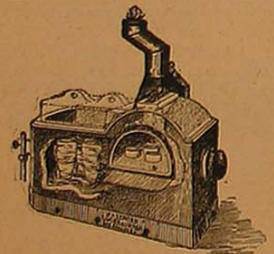
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DESCRIPTIVE CATALOGUE ON APPLICATION.

F. W. BRAUN & Co.,

Assayers Supplies of Every Description.

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LOS ANGELES, CAL.



This illustration shows L & C Combination Furnace, melting and cupelling simultaneously with one burner.

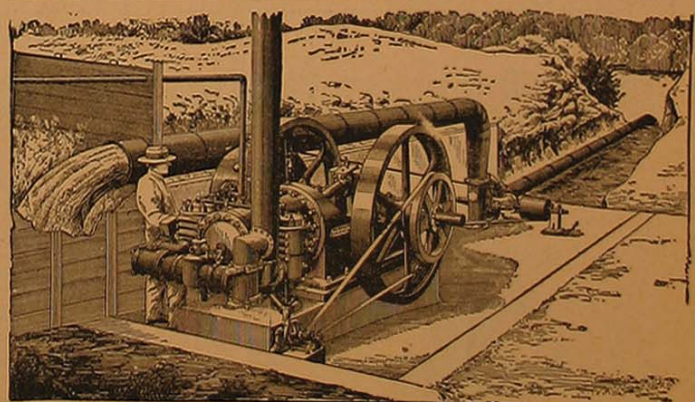
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MINING STOCK QUOTATIONS

BOSTON

Adventure	7 00	Mass	9 50
Aetna	—	Merced	10 00
Allouez	3 50	Mohawk	15 00
Anacanda	37 50	Napa	5 00
Arctadian	25 00	Old Colony Con.	5 00
Arnold	5 75	Old Dominion	25 00
Atlantic	25 00	Oswego	57 50
Baltic	17 50	Parrott	36 50
Bingham	10 00	Pioneer	—
Bonanza	—	Quincy	140 00
Boston & Mont'a	265 00	Rhode Island	5 00
Breece	—	Santa Fe	5 00
Butte & Boston	45 00	Santa Isabel	7 00
Calumet & Hecla	720 00	Tamarack	170 00
Catalpa	—	Tecumseh	3 75
Centennial	18 50	Tri-Mountain	6 38
Cochiti	11 50	Victor	3 00
Copper Range	29 00	United States	3 00
Crescent	—	Utah Con.	26 50
Dominion Pref.	42 00	Washington Ming	1 13
Franklin	13 25	White Knob	—
Gold Dredging	—	Winona	5 50
Humboldt	—	Wolverine	37 00
Ile Royale	22 75	Wyandotte	2 00
Melones	1 50		

ROSSLAND, BRITISH COLUMBIA.

Brand'n & G'd Crk	28	Kootenay Gold F.	—
Brit. Amer. Cor.	—	Lewick	—
Brit. Col. Dev. Co.	—	Lily May	10
Canad. G'd Fields	07 1/2	Lon & Van M.D. Co.	00
Cariboo	1 18 1/2	London B. C. G.F.	00
Commander	—	Monte Cristo	05 1/2
Deer Park	—	New G'd Fields B.C.	50
Dundee	13	Novity	—
Evening Star	09	Queen Bess Prop.	50
Fern	28	Rambler-Cariboo	68
Gold Fields of B.C.	—	Red Mount, View	—
Hattie Brown	—	Reco	—
Hall Mines	—	Silver Bell	—
Homestake	—	Silver Queen	—
Iron Horse	08	St. Elmo	05 1/2
Iron Mask	78	Slocan Star	1 10
Josie	—	Vic. Tr. M. Dev. Co.	—
Jumbo	25	Waverly Mines	—
Kenneth	—	War Eagle Con.	2 75
Keystone	—	White Bear	—

SAN FRANCISCO.

Alta	04	Mexican	30
Andes	10	Occidental	20
Belcher	33	Ophir	87
Best & Belcher	38	Overman	19
Bullion	04	Ontario	—
Caledonia	70	Plymouth	—
Challenge	30	Potosi	58
Chollar	31	Quicksilver	—
Confidence	80	Quicksilver pref'd	—
Con. Cal. & Va.	1 85	Savage	25
Crown Point	15	Seg. Belcher	03
Deadwood	—	Sierra Nevada	82

Gould & Curry	35	Silver Hill	—
Hale & Norcross	37	Standard	3 05
Homestake	—	Union Con.	38
Iron Silver	—	Utah	12
Justice	08	Yellow Jacket	28

COLORADO SPRINGS STOCKS

Acacia	28 1/2	Hayden	02
Alamo	09 1/2	Ingham Con.	10
Altamont	—	Isabella	9 1/2
American Con.	—	Jack Pot	65
Anacanda	4 1/2	Kimberly	13
Aola	0 1/2	Lexington	2 1/2
Arcadia Cons	0 1/2	Magnet Rock	05 1/2
Argentum Junata	25 1/2	Matosa	32 1/2
Bankers	05 1/2	Montreal	15 1/2
Banner	0 1/2	Mountain Beauty	09 1/2
Bob Lee	06 1/2	Mollie Gibson	27
Creede & C. C.	13	Moon Anchor	7 1/2
Cripple Crk Con	15 1/2	Mount Rosa	38 1/2
Dante	19 1/2	New Haven	08 1/2
Des Moines	05 1/2	Oriole	08 1/2
Elkton Con	1 17	Orphan	15 1/2
El Paso	4 1/2	Pharmacist	08 1/2
Emma Almee	02 1/2	Pilgrim	07
Fanny B.	0 1/2	Portland	2 45
Favorite	05	Pr. Albert	0 1/2
Findley	17	Rattler	07 1/2
Flower of the West	—	Specimen	15 1/2
Golden Fleece	28	Theresa	08 1/2
Gold & Globe	08	Trachyte	07 1/2
Gold King	94	Union	32 1/2
Gould	30 1/2	Vindicator	1 42
Granite Hill	03 1/2	Work	32 1/2

SALT LAKE CITY

Anchor	50	Joe Bowers Ex.	05
Ajax	98	La Reine	60
Alliance	—	Lower Mammoth	26
Alice	40	Little Pittsburgh	03 1/2
Bullion Beck	3 85	Mammoth	3 48 1/2
Buckeye	—	Mercur	0 93
Cent. Kureka	68	May Day	61
Chloride Point	25	Northern Light	14 1/2
Congor	25	North Swansea	—
Daly	1 41	Omaha	13
Daily West	12 73	Ontario	8 20
Dalton & Lark	03	Petro	40
Dalton	01	Rich. Anacanda	29
Dexter	2 45	Sunshine	30
Daisy	18 1/2	Swansea	3 92 1/2
Eagle	03 1/2	So. Swansea	1 35
Eagle & Blue Bell	1 45	Sunbeam	57 1/2
Emerald	12	Sacramento	46
Four Aces	13 1/2	Silver King	45 00
Geyser-Marion	34	Star Consolidated	43
Galea	30	Showen Con	36
Grand Central	5 50	Tetro	05
Golden Eagle	0 1/2	Utah	60
Horn Silver	1 17 1/2	Valco	85
Homestake	0 1/2	West M'n Pl'cer	11
Ingot	09	Yankee Coa.	15 1/2
Joe Bowers	17		

NEW YORK.

Adams Con	12	Isabella	1 40
Alamo	11 1/2	Iron Silver	50
Alice	35	Jefferson	—
Alliance	—	Jennie Blanche	—
Anacanda Copper	38	Justine	—
Anacanda Gold	44	King & Pemb	35
Anchoria L.	72	Leadville Cons	08
Argentum Junata	18	Little Chief	18
Belcher	12	Mexican	35
Best & Belcher	23	Mollie Gibson	24
Burt Gold	—	Mt. Rosa	45
Breece	1 75	Occidental	10
Branswick	24	Ontario	7 75
Chollar	20	Ophir	75
Chrysolite	—	Pharmacist	08
Comstock Tunnel	04	Phoenix	08
Comstock Stocks	—	Plymouth	08
Comstock Script.	05	Portland	2 28
Con. Cal. & Va.	1 45	Potosi	20
Cr. & Cr. Creek	08	Quicksilver	2 00
Crescent	12	Quicksilver pf'd	7 50
Crown Point	14	Rocky Mountain	—
Cripple Creek Con	18	San Juan Star	—
Deadwood Terra	45	Savage	05
Elkton	1 85	Sierra Nevada	47
Enterprise	—	Small Hope	80
Good Samaritan	—	Specimen	08
Gold Coin C. Crk	—	Standard Con	2 40
Gold Coin Gilpin	—	Syndicate	—
Golden Fleece	27 1/2	Union Con	20
Gould & Curry	20	Union	32 1/2
Gregory Gold	—	Utah Con	03
Hale & Norcross	30	Union Gold	—
High Five	—	Vindicator	—
Homestake	65	Work	28 1/2
Horn Silver	1 00	Yellow Jacket	20

SPOKANE, WASHINGTON.

Ben Hur	15	Mountain Lion	1 08
Black Tail	14	Morrison	—
Butte and Boston	05 1/2	Number Six	—
Cariboo	—	Pearl	11
Deer Trail No. 2	22	Princess Maude	14 1/2
Golden Harvest	—	Quilp	12
Insurgent	—	Rebate	—
Iron Monitor	—	Republic	49
Jim Blaine	31	San Foll.	—
Liberty	—	Tom Thumb	17
L. Pine Surp. Con	23	Winipeg	—
Morning Glory	11 1/2		

DENVER STOCK REPORT.

Aetna	—	Keystone	11 1/2
Anchoria Leland	70	Lillie	—
Anacanda	44	Matosa	32 1/2
Arcadia	0 1/2	Mollie Gibson	27
Argentum Junata	25 1/2	Moon Anchor	7 1/2
Bannor	0 1/2	Mt. Rosa	39 1/2

Bob Lee	05 1/2	Old Gold	—
Elkton	1 17	Peoples	07 1/2
El Paso	41 1/2	Pilgrim	—
Enterprise	17 1/2	Pine Creek	—
Fanny B.	00 1/2	Portland	2 45
Garfield	—	Prince Albert	0 1/2
Geo. Washington	—	Republic	09
Golden Eagle	—	Sacramento	08
Gold Coin	2 10	Smuggler	—
Gilpin & C. C.	—	Specimen	13 1/2
Gilpin Four	—	Tamarack	—
Golden Fleece	26	Union	32 1/2
Isabella	91 1/2	Virginia M.	08 1/2
Iron Clad	08 1/2	Wheels Cons.	—
Jack Pot	65	Work	32 1/2

MEXICO

Name of Company	State	Price
Amistad y Concordia	Hidalgo	29
Angustias	Guanajuato	280
Arevalo y Anexas	Hidalgo	200
Asturiana y Anexas	Zacatecas	180
Barrados y Cabras	Durango	40
Bartolome de Medina	Hidalgo	68
Cabezon y An.	Zacatecas	15
Candelaria de Pinos	Durango	180
Capatzen	Hidalgo	30
Carmen	Durango	400
Cinco Senores y An.	Guanajuato	350
Concepcion y Anexas	S. Luis Potosi	200
Coronas	Mexico	75
El Oro	Guanajuato	30
El Oro, pref.	Guanajuato	30
Esparanza y An.	Mexico	1,600
Gloria	Chihuahua	50
Guadalupe	Guanajuato	235
Luz de Borda Aviado	Michoacan	30
Luz de Borda aviado	Michoacan	—
Luz de Maravillas	Hidalgo	120
Paballon	Mexico	20
Palma de Somb.	Zacatecas	80
Pinosoles	Durango	2,000
Rafael y Annexes	Hidalgo	1,020
Real del Monte	Hidalgo	600
Restauradora	Durango	20
Rosario y Anexas	Durango	10
San Francisco	Hidalgo	195
San Rafael aviado	Hidalgo	410
San Rafael del Oro	Hidalgo	20
Ste. Maria de la Paz	S. Luis Potosi	240
Soledad	Hidalgo	330
Sorena	Hidalgo	50
Trinidad Aviador	Guanajuato	25
Trinidad Aviado	Guanajuato	40
Trinlaungo	Puebla	28
Union Huelada	Hidalgo	350
Zona Min. de Paz	Guanajuato	60

NOTE—The above Mexican stocks are figured on the basis of Mexican silver

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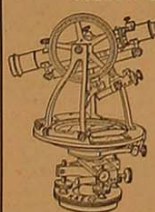
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Hoists and Haulage Plants, Mine Ventilators, Cars, Skips, Cages.

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FROM CRIPPLE CREEK

AIR COMPRESSORS
ROCK DRILLS,
Stone Channelers,
The Pohle Air Lift Pump,
Coal Cutters,

THE INGERSOLL-SERGEANT DRILL COMPANY, HAVEMEYER BUILD'G
NEW YORK

PARKE & LACY CO., AGENTS, SAN FRANCISCO, CAL.

JAMES F. BURNS, Pres't. JOHN HARNAN, Gen. Man.
FRANK O. BECK, Sec'y and Treas.
THE PORTLAND GOLD MINING CO.,
(Stock Transfer Office, Colorado Springs.)
Mines at Victor, Colorado.
COLORADO SPRINGS, COLO., May 19, 1898
The Ingersoll-Sergeant Drill Co.,
Gentlemen:—We bought two years ago one of the largest size of the straight line type of Ingersoll-Sergeant Piston Inlet Compressor.
This was found to be too small for our needs about a year ago and we purchased of you a Duplex Corliss machine 16" x 18" x 42".
This was set in place in our shaft house in the Cripple Creek District, 10,000 feet above the level of the sea, and has been running continuously ever since, and at times over to 3 1/2" Eclipse drills. The steam cylinders were connected to an independent Jet Condenser, for which we are using themine water, and the resultant economy of operation is very noticeable.
The operation of this Compressor is as near perfect as that of any machine we have ever seen, and this type is well worth the extra cost on account of the great permanent economy in operation.
Our mine is equipped exclusively with your drills and we have only the highest words of praise to give them.
Yours very truly, The Portland Gold Mining Co.,
Jas. A. Burns, President

New Catalogue No. 32

New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

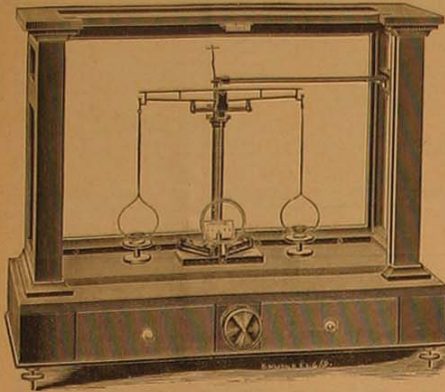
Special.

INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1899	\$ 195,000	Q.
2	Alamo	Utah	125,000	125,000	1	02	April 1899	2,500	G, C, I.
3	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	Oct 1899	4,220,000	G.
4	Alaska Mexican	Alaska	200,000	1,000,000	5	10	Oct 1899	429,031	G.
5	Anaconda Copper	Montana	1,200,000	30,000,000	25	2 00	Nov 1899	12,150,000	C.
6	Anchoria Leland	Colorado	600,000	600,000	1	03	Oct 1899	234,000	G.
7	American Gold	Colorado	800,000	3,000,000	10	09	June 1899	434,000	G, S, L.
8	American Coal	Maryland	60,000	1,500,000	25	1 25	Sept 1899	727,500	Coal
9	American Zinc, Lead and Smelting	Missouri	200,000	500,000	25	10	Oct 1899	40,000	Z, L.
10	April Fool	Nevada	500,000	500,000	1	01	Oct 1899	18,000	
11	Aurora	Michigan	100,000	2,500,000	25	50	June 1899	800,000	I.
12	Argonaut	California	200,000	2,000,000	10	10	Nov 1899	400,000	
13	Bald Butte	Montana	250,000	250,000	1	08	Dec 1899	762,141	G, C, S.
14	Bonanza Development	New Mexico	300,000	3,000,000	10	3 50	June 1899	1,600,000	
15	Boston & California	California	600,000	600,000	1	06	June 1899	72,000	
16	Boston and Colorado Smelting	Colorado	15,000	750,000	50	75	Oct 1899	375,000	
17	Boston & Montana Con.	Montana	150,000	3,750,000	25	1 00	Nov 1899	14,500,000	G, C, S.
18	Breece	Colorado	200,000	5,000,000	25	05	Dec 1899	70,000	I.
19	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Dec 1899	2,438,400	G, S.
20	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Dec 1899	768,000	S, L.
21	Cariboo-McKinney	British Col.	800,000	800,000	1	01½	June 1899	311,965	G.
22	Calumet & Hecla	Michigan	10,000	2,500,000	25	20 00	Sept 1899	64,850,000	C.
23	Centennial Eureka	Utah	30,000	1,500,000	50	50	Aug 1899	2,150,000	S, L.
24	Central Lead	Missouri	10,000	1,000,000	100	50	Dec 1899	142,000	L.
25	Charleston	S. Carolina	10,000	1,000,000	100	2 00	June 1899	200,000	
26	Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1899	1,945,000	G, S, C.
27	Commonwealth pref.	Missouri	100,000	500,000	5	01	Dec 1899	20,000	Z.
28	Delta Lead & Zinc	Missouri	100,000	100,000	1	00½	Dec 1899	4,100	
29	De Lamar	Idaho	400,000	2,000,000	5	12	May 1899	2,346,000	G, S.
30	Deer Trail No.2	Washington	1,000,000	1,000,000	1	00½	Nov 1899	45,000	
31	Doe Run	Missouri	5,000	500,000	100	50	Dec 1899	90,000	L.
32	Empire State Idaho	Idaho	75,000	750,000	10	30	Dec 1899	323,037	
33	Fanny Rawlings	Colorado	1,000,000	1,000,000	1	01	Aug 1899	20,000	G, S.
34	Ferris-Haggerty	Wyoming	1,000,000	1,000,000	1	00½	Mar 1899	5,000	C, G, S.
35	Garfield Consolidated	Colorado	1,200,000	1,200,000	1	01	May 1899	34,000	G.
36	Golden Star	Ontario, Canada	100,000	100,000	1	01	July 1899	41,000	
37	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Nov 1899	260,000	G.
38	Gold King	Colorado	1,000,000	1,000,000	1	03	Oct 1899	90,000	G.
39	Golden Cycle	Colorado	200,000	1,000,000	5	05	Dec 1899	258,500	
40	Grafton	Colorado	1,000,000	1,000,000	1	01	Nov 1899	10,000	G.
41	Grand Central	Utah	250,000	250,000	1	24	Sept 1899	666,250	G, S, C, L.
42	Gwin	California	20,000	1,000,000	50	25	Dec 1899	101,500	G.
43	Grass Valley Exploration	California	50,000	100,000	2	25	Oct 1899	30,000	
44	Helena and Frisco	Idaho	500,000	2,500,000	5	25	Nov 1899	920,000	S, L.
45	Highland	S. Dakota	100,000	10,000,000	100	20	July 1899	3,924,718	G.
46	Holy Terror	S. Dakota	300,000	300,000	1	01	Nov 1899	162,000	G.
47	Homestake	S. Dakota	125,000	12,500,000	100	50	Nov 1899	8,038,750	G.
48	Horn Silver	Utah	400,000	10,000,000	25	05	July 1899	5,270,000	S, L.
49	Idaho	British Columbia	500,000	500,000	1	05½	Jan 1899	292,000	
50	Isabella	Colorado	2,250,000	2,250,000	1	01	Sept 1899	472,500	G.
51	Jack Pot	Colorado	1,000,000	1,000,000	1	04	Sept 1899	75,000	G.
52	Jamison	California	390,000	3,900,000	10	10	April 1899	50,700	
53	Klondike Bonanza, Ltd	Klondike	52,750	263,750	5	24	Aug 1899	12,680	
54	Lake Superior Iron	Michigan	84,000	2,100,000	5	25	Feb 1899	736,000	L.
55	Lillie	Colorado	1,000,000	1,000,000	1	05	Nov 1899	301,610	G.
56	Modoc	Colorado	500,000	500,000	1	01	Nov 1899	170,000	G.
57	Montana Ltd	Montana	600,000	3,300,000	5	12	Apr 1899	2,997,557	G, S.
58	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Oct 1899	1,360,000	
59	Morning Star	California	2,400	240,000	100	3 00	Oct 1899	751,800	G.
60	Mercur	Utah	200,000	5,000,000	25	25	Oct 1899	1,341,000	G.
61	Mammoth	Utah	400,000	10,000,000	25	10	Nov 1899	1,610,000	G, S, C, L.
62	Mead	California	2,000,000	2,000,000	1	20	June 1899	120,000	
63	Moulton	Montana	400,000	2,000,000	5	05	Oct 1899	500,000	
64	Mt. Shasta	California	20,000	100,000	5	30	May 1899	6,000	
65	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Nov 1899	1,130,000	S, G.
66	New York Zinc	Missouri	28,000	700,000	25	25	Dec 1899	21,000	
67	Napa Cons.	California	100,000	700,000	7	30	Oct 1899	1,040,000	Q.
68	New Idria Quicksilver	California	100,000	500,000	5	30	Oct 1899	170,000	Q.
69	North Star, Mines of N. J.	California	200,000	2,000,000	10	20	Nov 1899	50,000	G.
70	Original Empire	California	50,000	5,000,000	100	1 00	May 1899	500,000	G.
71	Oscola	Michigan	50,000	1,250,000	25	3 00	Dec 1899	3,080,500	C.
72	Parrot	Montana	230,000	2,300,000	10	1 50	Oct 1899	3,035,898	C.
73	Pennsylvania Consolidated	California	51,500	5,150,000	10	20	Dec 1899	138,475	
74	Pioneer	California	100,000	1,000,000	10	12½	Mar 1899	62,500	G.
75	Portland	Colorado	3,000,000	3,000,000	1	02	Nov 1899	2,437,080	G, S.
76	Quicksilver Pref.	California	43,000	4,300,000	100	50	May 1899	1,845,411	Q.
77	Quicksilver Consolidated	California	57,000	5,700,000	100	40	July 1899	643,867	Q.
78	Quincy	Michigan	100,000	2,500,000	25	6 00	August 1899	11,070,000	C.
79	*Republic Consolidated	Washington	3,000,000	3,000,000	1	01	Sept 1899	323,000	G.
80	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	01	Dec 1899	60,000	S, L.
81	Royal Consolidated	British Col.	2,500,000	2,500,000	1	01	June 1899	1,050,000	G.
82	Sacramento	Utah	1,000,000	5,000,000	5	00½	Oct 1899	138,000	G.
83	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Feb 1899	3,325,000	S.
84	South Swansea	Utah	150,000	150,000	1	05	Dec 1899	165,000	S, L.
85	Standard	Idaho	500,000	500,000	1	06	Apr 1899	1,745,000	G, S.
86	Standard Consolidated	California	200,000	20,000,000	100	10	Aug 1899	3,879,226	G, S.
87	St. Joseph	Missouri	30,000	3,000,000	10	50	June 1899	2,859,500	L.
88	Silver King	Utah	150,000	3,000,000	20	34	Dec 1899	2,400,000	S, L, G.
89	Smuggler	Colorado	1,000,000	1,000,000	1	01	Dec 1899	1,220,000	S, L, Z.
90	Swansea	Utah	100,000	500,000	5	05	Nov 1899	251,000	S, L.
91	Tamarack	Michigan	60,000	1,500,000	15	6 00	Dec 1899	6,270,000	C.
92	Tomboy	Colorado	200,000	2,000,000	10	24	Dec 1899	812,000	G.
93	Vindicator Consolidated	Colorado	1,500,000	1,500,000	1	05	Oct 1899	304,500	G.
94	War Eagle Consolidated	British Col.	2,000,000	1,000,000	1	01½	Dec 1899	492,750	
95	Wolverine	Michigan	60,000	2,500,000	25	1 50	Oct 1899	270,000	C.
96	Yellow Aster	California	100,000	1,000,000	10	10	Dec 1899	283,789	G.

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

N. B.—Companies not listed paid nothing in the last twelve moths. *Paid since consolidation, \$203,000; Republic paid \$120,000 under old management

No. 045 Button Balances

Sensibility 1-50 Milligramme

This balance was designed with a view to furnishing an accurate and reliable balance for silver button and moderately accurate gold button work.

It has all the latest improvements and is an up-to-date balance in every particular.

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3/4 Actual Size

The engraving herewith illustrates Brunston's Pat. Pocket Mine Transit as it appears when folded ready for the pocket.

The working parts are enclosed by an aluminum case, the outside dimensions of which are but $2\frac{3}{4} \times 2\frac{3}{4} \times 1$ inches and the total weight but 8 ounces.

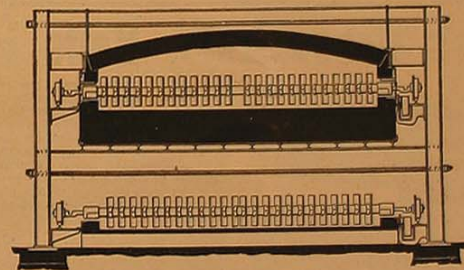
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WE CLAIM—That These Furnaces are built from Original Designs fully covered by Strong Patents which we control and will Protect. The design embodies **NUMEROUS NEW FEATURES** in the construction of Ore Roasting Furnaces and Does Not Imitate or rely on any of the old and very faulty models.

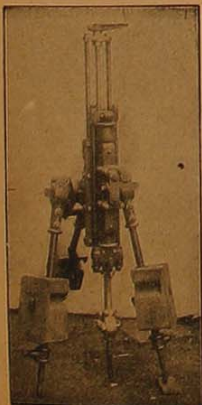


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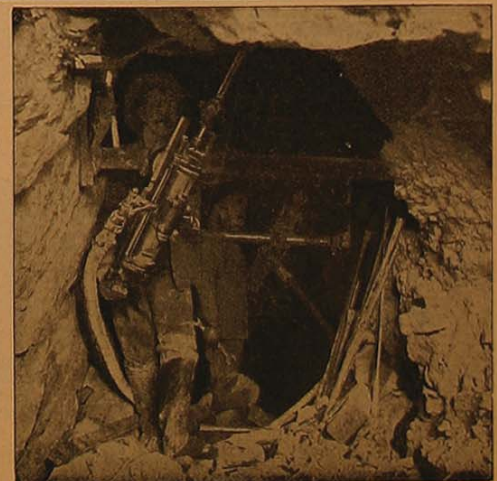
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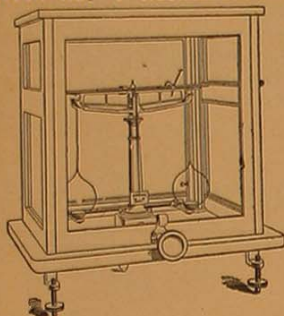


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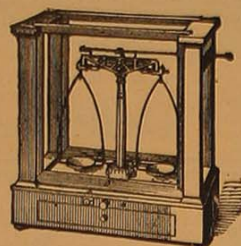
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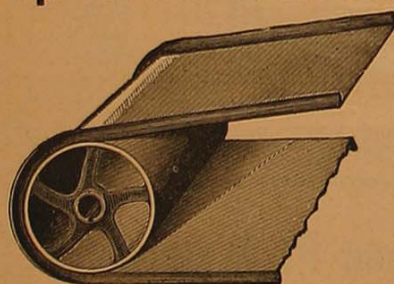
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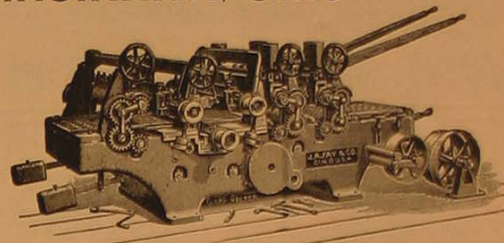
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Leave Los Angeles, 10:10 a. m.
Leave San Bernardino 12:50 p. m.
Arrive Barstow 3:40 p. m.
Leave Barstow 3:55 p. m.
Arrive Kramer, 5:05 p. m.
Arrive St. Elmo, 8:25 p. m.
Arrive Johannesburg 8:50 p. m.

Returning Trains Leave
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Arrive San Bernardino 5:45 a. m.
Arrive Los Angeles, 8:25 a. m.

A through passenger coach is run between Barstow and Johannesburg.

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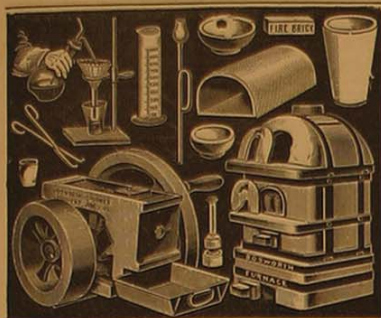
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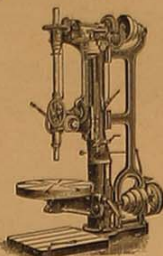
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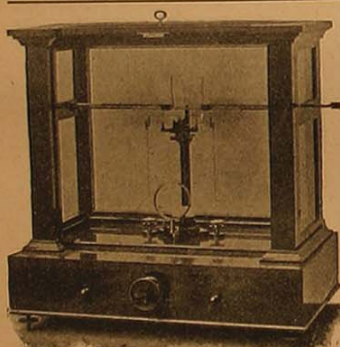
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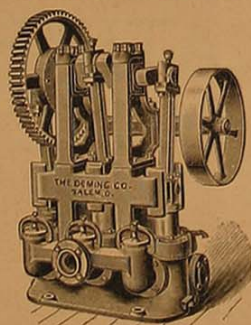
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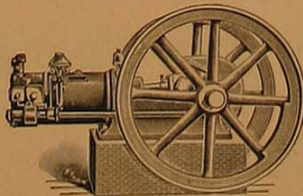
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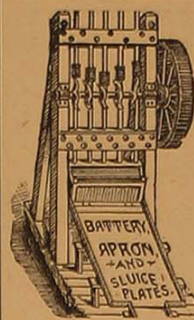


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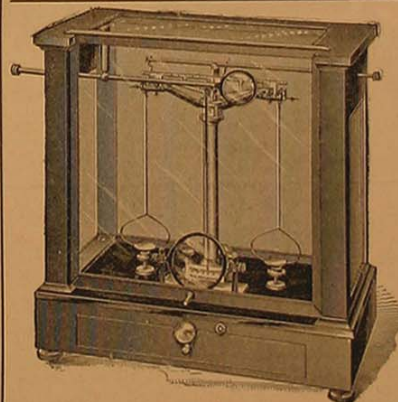
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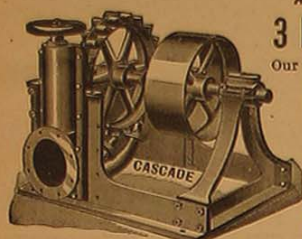
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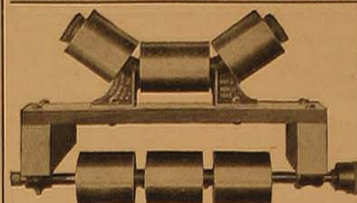
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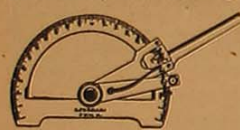
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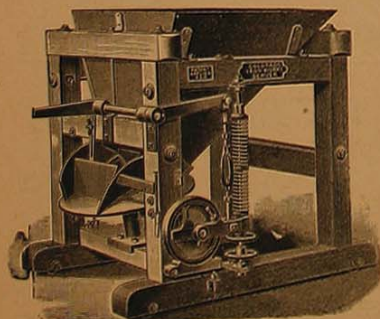
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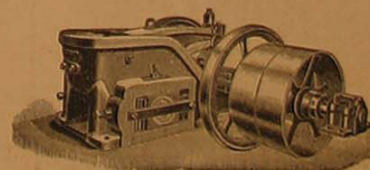
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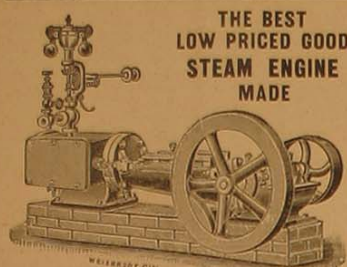
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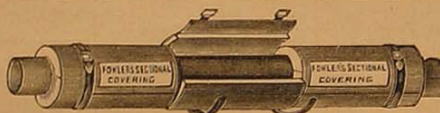
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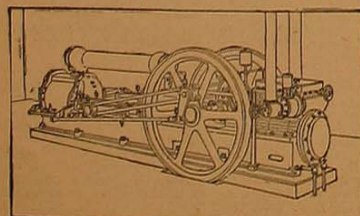
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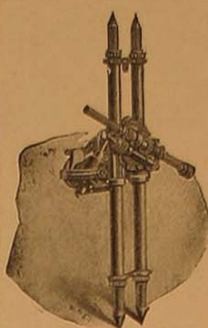


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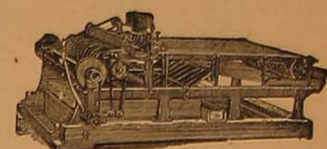
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

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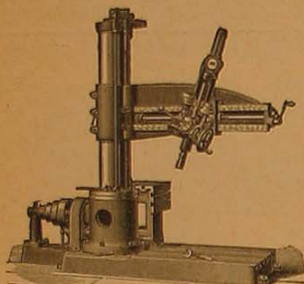
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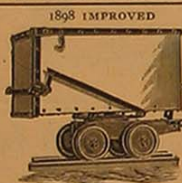
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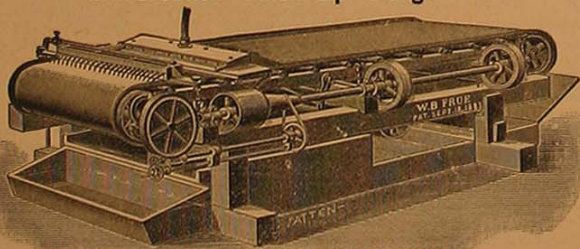
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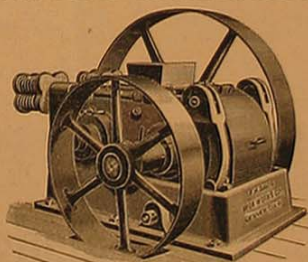
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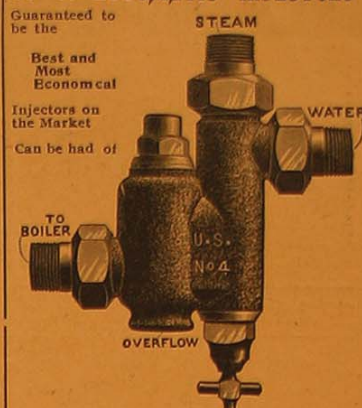
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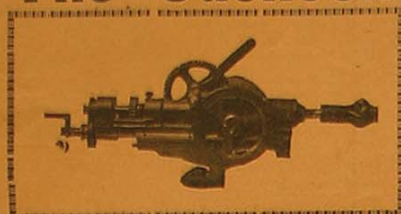
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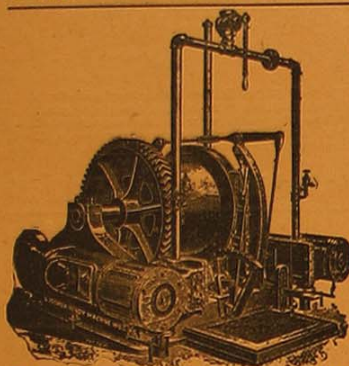
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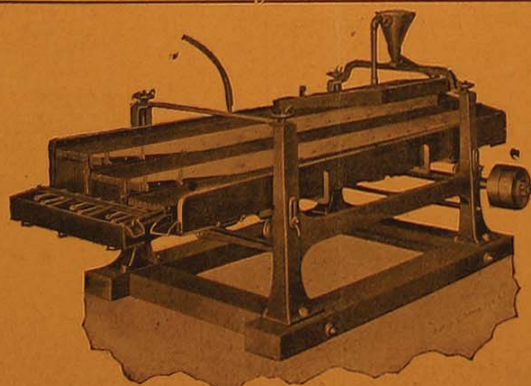
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